State of Hawaii
DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESOURCE MANAGEMENT DIVISION
Honolulu, Hawaii

BOARD OF AGRICULTURE

Phyllis Shimabukuro-Geiser
Chairperson

CONTRACT SPECIFICATIONS AND PLANS

Job No. DOAM02A
East Maui Water System Improvements
at Wailuanui
Wailuanui, Maui, Hawaii

Civil Engineer: AECOM

March 2020

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AGRICULTURAL RESOURCE MANAGEMENT DIVISION
Honolulu, Hawaii

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Job No. DOAM02A
East Maui Water System Improvements
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Approved: _____

BRIAN KAU, P.E.
Administrator and Chief Engineer
Agricultural Resource Management Division
Department of Agriculture

March 2020

NOTICE TO BIDDERS
(Chapter 103D, HRS)

COMPETITIVE BIDS for **Job No. DOAM02A, East Maui Water System Improvements at Wailuanui, Wailuanui, Maui, Hawaii** shall be submitted to the Department of Agriculture on the specified date and time through the Hawaii State e-Procurement (HIePRO). HIePRO is accessible through the State Procurement Office website at www.spo.hawaii.gov.

The Department of Land and Natural Resources Interim General Condition, dated October 1994, as amended, and the General Conditions –AG008, latest revision shall be made part of the specifications.

The project site is located in Wailuanui, Maui, Hawaii

The work at Wailuanui shall generally consist of clearing and grubbing, excavation, backfill, compaction, grading, installation of grouted riprap, non-structural shotcrete, grouted anchors, gravel access road, and site BMPs.

Due to the nature of work contemplated, bidders must possess a valid State Contractor's license, classification A.

Due to the current pandemic, a mandatory pre-bid conference will be held via video teleconference on Monday May 4, 2020 at 11:00 am. Interested parties shall notify Janice Fujimoto via email (janice.fujimoto@hawaii.gov) by April 30, 2020.

All interested parties are invited to attend a site visit during the week of May 4, 2020. Due to current travel restrictions, site visits will be conducted with the farmers. The date and time of the site visit will be announced at pre-bid conference.

The estimated cost of construction is $2,600,000.

The award of the contract, if it be awarded, will be subject to the availability of funds.

This project is subject to preference to Hawaii Products established by Section 103D, Hawaii Revised Statutes. The Hawaii Product List may be examined at the State Procurement Office website.

Since the estimated cost of construction is $250,000 or more, the apprenticeship agreement preference pursuant to Hawaii Revised Statutes §103-55.6 (ACT 17, SLH 2009) shall apply.

Should there be any questions, please refer to the HIePRO solicitation.

INFORMATION AND INSTRUCTIONS TO BIDDERS

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INFORMATION AND INSTRUCTIONS TO BIDDERS

A. PROJECT LOCATION AND SCOPE OF WORK: The project location and scope of work shall be as generally described in the Notice to Bidders.

B. PROPOSALS**:** Bidders shall submit their bid, including the completed proposal form, bid bond, and any other documents required by the solicitation as part of their bid through the State of Hawaii e-Procurement System (HIePRO). See Item D, PROPOSAL FORM.

C. GENERAL CONDITIONS: The Department of Land and Natural Resources Interim General Conditions dated October 1994, as amended, shall be made a part of these contract specifications and are referred to hereafter as the General Conditions.

D. PROPOSAL FORM: **The Bidders shall fill out and upload the electronic copy of the proposal form to the HIePRO website when submitting the bid. Bid Proposals shall not be mailed, faxed or delivered to the State, unless requested to do so after the designated closing date. The successful Bidder shall fill out and print a hard copy of the proposal form, sign and submit the form with the contract award package.**

E. OMISSIONS OR ERASURES: Any proposal which contains any omission or erasure or alteration not properly initialed, or conditional bid, or other irregularity may be rejected by the Board of Land and Natural Resources (Board).

F. NOTICE OF INTENT TO BID AND QUESTIONNAIRE:
A Notice of Intent to Bid is not required for this project. In compliance with HRS Section 103D-310, the lowest responsive and responsible bidder may be required to complete a questionnaire. When requested by the State, the completed questionnaire shall be submitted to the Chief Engineer for evaluation. Failure to furnish the requested information within the time allowed may be grounds for a determination of non-responsibility, in accordance with HRS Section 103D-310 and HAR Section 3-122-108.

G. BID SECURITY: A bid security will be furnished by each bidder as provided in sub-section 2.7 of the General Conditions. The successful bidder's bid security will be retained until Contract execution and furnished a performance and payment bond in an amount equal to one hundred percent (100%) of the total Contract price, including an amount estimated to be required for extra work, is furnished.

The Board reserves the right to hold the bid securities of the four lowest bidders until the successful bidder has entered into a contract and has furnished the required performance bond. All bid securities will be returned in accordance with sub-section 3.5 of the General Conditions.

Should the successful bidder fail to enter into a contract and furnish a satisfactory performance bond within the time stated in the proposal, the bid security shall be forfeited as required by law.

H. CONTRACTOR'S LICENSE REQUIRED: The Board will reject all bids received from contractors who have not been licensed by the State Contractors License Board in accordance

with Chapter 444, HRS; Title 16, Chapter 77, Hawaii Administrative Rules; and statutes amendatory thereto.

I. IRREGULAR BIDS: No irregular bids or propositions for doing the work will be considered by the Board.

J. WITHDRAWAL OF BIDS: No bidder may withdraw his bid between the time of the opening thereof and the award of contract.

K. SUCCESSFUL BIDDER TO FILE PERFORMANCE AND PAYMENT BONDS: The successful bidder will be required to file performance and payment bonds each; in the amount equal to the total contract price, including amounts estimated to be required for extra work, as provided in sub-section 3.6 of the General Conditions.

L. NUMBER OF EXECUTED ORIGINAL COUNTERPARTS OF CONTRACT DOCUMENTS: If requested by the Board, six copies of the Contract, performance and payment bonds shall be executed.

M. CHANGE ORDERS: No work of any kind in connection with the work covered by the plans and specifications shall be considered as change order work, or entitle the Contractor to extra compensation, except when the work has been ordered in writing by the Chief Engineer (Engineer) and in accordance with sub-section 4.2 of the General Conditions.

The Contractor shall clearly identify and inform the Engineer in writing of any deviations from the contract documents at the time of submission and shall obtain the Engineer's written approval to the specified deviation prior to proceeding with any work.

N. WAGES AND HOURS: In accordance with sub-sections 7.3 to 7.9 of the General Conditions relative to hours of labor, minimum wages and overtime pay, the current minimum wage rates promulgated by the Department of Labor and Industrial Relations (DLIR) shall be paid to the various classes of laborers and mechanics engaged in the performance of this contract on the job site. The minimum wages shall be increased during the performance of the contract in an amount equal to the increase in the prevailing wages for those kinds of work as periodically determined by the DLIR.

The Department of Agriculture will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the said minimum wage rates. The possibility of wage increase is one of the elements to be considered by the Contractor in determining his bid, and will not, under any circumstances, be considered as the basis of a claim against the Department under this Contract.

No work shall be done on Saturdays, Sundays, legal State holidays, and/or in excess of eight (8) hours each day without the written consent of the Engineer. Should permission be granted to work at such times, the Contractor shall pay for all inspection administrative costs thereof. No work shall be done at night unless authorized by the Engineer.

O. PERMITS: The State will process permit applications whenever possible, and the Contractor shall procure the pre-processed permits and pay the required fees. If permit applications are not processed by the State, the Contractor shall process the permit applications, permits and

licenses, and pay all charges and fees. In all cases, the Contractor shall give all notices necessary and incident to the due and lawful prosecution of the work.

P. PROPERTY DAMAGE: It shall be the responsibility of the contractor to respect State property and to prevent damage to existing improvements. The Contractor will be responsible for damages resulting from construction operations. Immediately upon discovery, the Contractor shall repair such damage to the satisfaction of the Engineer.

All trees and shrubbery outside the excavation, embankment or construction limits shall be fully protected from injury.

Q. TIME: The time of completion is specified in the Proposal. It is the Board's intention to insist the Contractor diligently prosecute the work to completion within the specified time.

Prospective bidders are reminded that the State has the option to proceed with or abandon a project depending on whether the project can be completed for occupancy in the specified time.

It is the bidder's responsibility to check the availability of all materials before bidding. The bidder shall select sub-contractors and suppliers who can warrant availability and delivery of all specified or qualified materials to assure project completion within the specified time.

The successful bidder must assume all risks for completing the project by the specified date. There shall be no extension of time for any reason except for delays caused by acts of God, labor disputes involving unions, or actions of the State. If for any reason the project falls behind schedule, the Contractor shall at its own cost, take necessary remedial measures to get the project back on schedule, i.e., working overtime, air freighting all materials, etc. In addition, if the Contractor fails to fully complete the project by the completion date, Contractor will be required to make the facility usable at its own cost.

R. BIDDER'S RESPONSIBILITY TO PROVIDE PROPER SUPERINTENDENCE: The successful low bidder shall designate in writing to the Engineer the name of its authorized superintendent (Superintendent), who will be present at the job site whenever any work is in progress. The Superintendent shall be responsible for all work, receiving and implementing instructions from the Engineer in a timely manner. The cost for superintendence shall be considered incidental to the project.

If the Superintendent is not present at the site of work, the Engineer shall have the right to suspend the work as described under sub-section 5.5 c. and 7.20 - Suspension of Work of the General Conditions.

S. LIQUIDATED DAMAGES: Liquidated damages in the amount specified in the Proposal will be assessed for each and every calendar day from and after the expiration of the time period stated in the Contract for the completion of the project.

T. HIRING OF HAWAII RESIDENTS: The Contractor shall comply with Act 68, SLH 2010, in the performance and for the duration of this contract. The Contractor shall ensure that Hawaii residents compose not less than eighty percent of the workforce employed to perform the contract work on the project. The eighty percent requirement shall be determined by

dividing the total number of hours worked on the contract by Hawaii residents, by the total number of hours worked on the contract by all employees of the Contractor in the performance of the contract. The hours worked by any Subcontractor of the Contractor shall count towards the calculation for this section. The hours worked by employees with shortage trades, as determined by the Department of Labor and Industrial Relations (DLIR), shall not be included in the calculation for this section.

The requirements shall apply to any subcontract of $50,000 or more in connection with the Contractor, that is, such Subcontractors must also ensure that Hawaii residents compose not less than eighty percent of the Subcontractor's workforce used to perform the subcontract.

U. WATER AND ELECTRICITY: The Contractor shall make all necessary arrangements and pay all expenses for water and electricity used in the construction of this project.

V. PUBLIC CONVENIENCE AND SAFETY: The Contractor shall conduct construction operations with due regard to the convenience and safety of the public at all times. No materials or equipment shall be stored where it will interfere with the safe passage of public traffic. The Contractor shall provide, install, and maintain in satisfactory condition, all necessary signs, flares and other protective facilities and shall take all necessary precautions for the protection of the work and the convenience and safety of the public. The Engineer shall have the right to suspend the performance of the work in accordance with sub-section 7.20 - Suspension of Work of the General Conditions.

W. WORK TO BE DONE WITHOUT DIRECT PAYMENT: Whenever the contract that the Contractor is to perform work or furnish materials of any kind for which no price is fixed in the contract, it shall be understood that the Contractor shall perform such work or furnish said materials without extra charge or allowance or direct payment of any sort. The cost of performing such work or furnishing said material is to be included by the Contractor in a unit price for the appropriate item unless it is expressly specified that such work or material is to be paid for as extra work.

X. AS-BUILT DRAWINGS: As-built drawings, the intent of which is to record the actual in-place construction so that any future renovations or tie-ins can be anticipated accurately, shall be required. All authorizations given by the Engineer to deviate from the plans shall be drawn on the job site plans. All deviations from alignments, elevations and dimensions which are stipulated on the plans shall be recorded on the as-built drawings. Final as-built drawings shall be submitted to the Engineer for review and approval. After the Engineer approves the as-built drawings, the contractor shall submit an electronic copy in Adobe PDF format on CD ROM.

Y. ASBESTOS CONTAINING MATERIALS: The use of asbestos containing materials or equipment is prohibited. The Contractor shall insure that all materials and equipment incorporated in the project are asbestos-free

Z WORKER SAFETY: The Contractor shall provide, install and maintain in satisfactory condition all necessary protective facilities and shall take all necessary precautions for the protection and safety of its workers in accordance with the Occupational Safety and Health Standards for the State of Hawaii. The Engineer shall have the right to suspend the performance of the work in accordance with sub-section 7.20 - Suspension of Work of the

General Conditions.

AA. TOILET FACILITIES: All toilet facilities constructed at the project site shall be in accordance with the Public Health Regulations of the State Department of Health (DOH). All necessary precautions shall be observed at the project site. The use of sanitary facilities shall be strictly enforced and workers violating these provisions shall be promptly discharged.

BB. SIGNS: Whenever the project involves closing or obstructing any public thoroughfare, the Contractor shall provide traffic signs conforming to the applicable provisions of the current edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways", published by the Federal Highway Administration as directed by the Engineer for the purpose of diverting or warning traffic prior to the construction area. All traffic signs shall bear proper wording stating thereon the necessary information as to diverting or warning traffic.

All signs shall be kept neat and clean, and properly erected at all times.

CC. FIELD OFFICE AREA FOR DEPARTMENT: When indicated in the Proposal, the Contractor shall provide a housed working area of at least 100 square feet adjacent to the Contractor's office for the Department's use. This area will be used by the Engineer to perform tests and to store equipment. As a minimum, the field office shall include the following: standard sized office desk and chair, lighting, ventilation, window-type air conditioning rated at 5,000 BTU, door and window with locking hardware, electrical outlets, and working communications facilities (a cellular telephone is acceptable). The Department will pay for all long distance toll charges made by the Engineer.

DD. QUANTITIES: All bids will be compared on the basis of quantities of work to be done as shown in the Proposal; the quantities shown in the Unit Price items are estimated, being given as a basis for comparison of bids. The Board reserves the right to increase or decrease the quantities given under the items or delete items entirely as may be required during the progress of the work.

EE. OTHER HEALTH MEASURES: Forms of work site exposure or conditions which may be detrimental to the health or welfare of workers or of the general public shall be eliminated or reduced to safe levels as required by the DOH codes, standards, and regulations. Suitable first aid kits and a person qualified to render first aid, as specified in the DOH regulations, shall be provided at all times when work is scheduled.

FF. HAWAII BUSINESS OR COMPLIANT NON-HAWAII BUSINESS REQUIREMENT: Bidders (Contractors) shall be incorporated or organized under the laws of the State or be registered to do business in the State as a separate branch or division that is capable of fully performing under the contract, as stipulated in §3-122-112 HAR.

GG. COMPLIANCE WITH §3-122-112 HAR:
As a condition for award of the contract and as proof of compliance with the requirements of 103D-310(c) HRS, the apparent low bidder shall furnish the required documents to the Department. If the valid required certificates are not submitted on a timely basis for award of a contract, a bidder otherwise responsive and responsible may not receive the award. Bidder

is responsible to apply for and submit the following documents to the Department.

A. TAX CLEARANCE REQUIREMENTS (HRS Chapter 237): Bidder shall obtain a tax clearance certificate from the Hawaii State Department of Taxation (DOTAX) and the Internal Revenue Service (IRS). The certificate is valid for six months from the most recently approved stamp date on the certificate; the certificate must be valid on the date received by the Department.

B. Department of Labor (DLIR) "**Certificate of Compliance**". (HRS Chapter 383 - Unemployment Insurance, Chapter 386 - Workers' Compensation, Chapter 392 - Temporary Disability Insurance, and 393 – Prepaid Health Care): Bidder shall obtain a certificate of compliance from the Hawaii State Department of Labor and Industrial relations (DLIR). The certificate is valid for six months from the date of issue; certificates must be valid on the date received by the Department.

C. Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG) "**Certificate of Good Standing**". Bidder shall obtain a certificate of good standing issued by the Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG). The certificate of good standing is valid for six months from the date of issue; certificates must be valid on the date received by the Department.

Alternately, instead of separately applying for these certificates at the various state agencies, bidder may choose to use the Hawaii Compliance Express (HCE), which allows businesses to register online through a simple wizard interface at http://vendors.ehawaii.gov to acquire a "Certificate of Vendor Compliance" indicating the bidder's status is compliant with the requirements of §103D-310(c), HRS, and shall be accepted for contracting and final payment purposes. Bidders that elect to use the new HCE services will be required to pay an annual fee of $15.00 to the Hawaii Information Consortium, LLC (HIC). Bidders choosing not to participate in the HCE program will be required to provide the paper certificates as instructed in the previous paragraphs.

P R O P O S A L

FOR

DEPARTMENT OF AGRICULTURE
AGRICULTURE RESOURCE MANAGEMENT DIVISION
State of Hawaii

Job No. DOAM02A
East Maui Water System Improvements
at Wailuanui
Wailuanui, Maui, Hawaii

_____, 2020

Chief Engineer
Agricultural Resource Management Division
Department of Agriculture
State of Hawaii
Honolulu, Hawaii

Dear Sir:

The undersigned, having carefully examined the local conditions and all available records and information covering conditions which may affect the cost of the work to be performed, and having carefully examined the Plans and Specifications, and other contract documents, hereby proposes to furnish and pay for all materials, tools, equipment, labor and other incidental work necessary to repair the irrigation ditch and perform the installation of grouted riprap, shotcrete, grouted anchors, gravel access road, excavation, compaction, grading, clearing and grubbing, and site BMPs, as required or called for in this Proposal, all according to the true intent and meaning of the Notice to Bidders, Information and Instructions to Bidders, Proposal, Detailed Specifications, Interim General Conditions, Plans, and any and all addenda for:

Job No. DOAM02A
East Maui Water System Improvements
at Wailuanui
Wailuanui, Maui, Hawaii

on file in the office of the Engineering Division for the TOTAL BASE BID (Items 1 to 10) of:

_____

_____Dollars ($_____)

and will fully complete all work under this contract within 365 consecutive calendar days from the date of written notice to proceed, including date of said order, said total sum being itemized on the following pages.

PROPOSAL

Item No.	Quantity	Unit	Description	Unit Price	Total
			BASE BID		
1.	1	LS	Mobilization and Demobilization (not to exceed 10% of the Total Sum Base Bid)	LS	$_____
2.	1	LS	Clearing and Grubbing	LS	$_____
3.	1	LS	Gravel Access Road, in place complete	LS	$_____
4.	1	LS	Excavation for Irrigation Ditch	LS	$_____
5.	1	LS	Grouted Riprap, including backfill, compaction, and grading, in place complete	LS	$_____
6.	1	LS	Shotcrete, including anchors, FRP dowels, steel reinforcement, and geocomposite drains, in place complete	LS	$_____
7.	1	LS	Installation, Maintenance, Monitoring, and Removal of BMPs, including protection of existing ditch	LS	$_____
8.	1	LS	Restoration of staging areas and gravel access roads, in place complete	LS	$_____
9.	1	Allowance	Additional Water Pollution, Dust, and Erosion Control BMPs	Allowance	$ 10,000
10.	1	Allowance	Field Archaeological On-Site Monitoring	Allowance	$ 10,000
			Total Sum BASE BID (Items 1-10, Inclusive)		$

HAWAII PRODUCTS PREFERENCE AND/OR USE OF HAWAII PRODUCTS

In accordance with Act 175, SLH 2009, the Hawaii products preference is applicable to this solicitation. Bidders offering a Hawaii product ("HP") shall identify the HP in the table below.

Persons desiring to qualify their product(s) not currently on the Hawaii Product List, shall complete Form SPO-38, *Certification for Hawaii Product Preference*, and submit the completed form no later than the deadline specified in the procurement notice and solicitation. The responsibility for certification and qualification shall rest upon the person requesting the preference. One form shall be completed and submitted for each product. Form SPO-38 is available at http://hawaii.gov/spo/

For the purpose of selecting the low bid when a solicitation contains both HP and non-HP, the price offered for a HP item shall be decreased by subtracting 10% for the class I or 15% for the class II HP item(s) offered. The lowest total offer, taking the preference into consideration, shall be awarded the contract, unless the offer provides for additional award criteria. The contract amount of any contract awarded, however, shall be the amount of the price offered, exclusive of the preferences.

In the event of any change that materially alters the bidder's ability to supply the Hawaii product(s), the bidder shall immediately notify the procurement officer in writing and the parties shall enter into discussions for the purpose of revising the contract or terminating the contract for convenience.

Item No.	Pre-Approved Hawaii Product Description & Manufacturer	Class (I or II)	Quantity	Unit Measure	Unit Price	Total Price
1.						
2.						
3.						
4.						

RECYCLED PRODUCTS PREFERENCE

This project allows a 10% price preference for recycled products in accordance with HRS 103D-1005. Please indicate your selection of recycled or non-recycled product by indicating its cost FOB jobsite unloaded in the schedule below, including applicable General Excise & Use Taxes.

DESCRIPTION	RECYCLED PRODUCT COST	NONRECYCLED PRODUCT COST
_____	$_____	$_____
_____	$_____	$_____
_____	$_____	$_____
_____	$_____	$_____

The bidder requesting a recycled product preference shall also complete and submit the form "CERTIFICATION OF RECYCLED CONTENT" as shown in the Interim General Conditions and provide all supporting information with this proposal. Additional information may be requested to qualify a product.

The following definitions are applicable to the CERTIFICATION OF RECYCLED CONTENT form:

"Post-consumer recovered material" means any product used by a consumer, including a business that purchases the material, that has served its intended end use, and that has been separated or diverted from the solid waste stream for the purpose of use, reuse, or recycling.

"Product" includes materials, manufactures, supplies, merchandise, goods, wares, and foodstuffs.

"Recovered material" means waste material and by-products that have been separated, diverted, or removed from the solid waste stream after a manufacturing process for the purpose of use, reuse, or recycling. Recovered material does not include those materials and by-products that are generated and normally reused on-site or within original manufacturing processes (such as mill broke, in the case of paper products).

"Recycled content" means the percentage of a product composed of recovered material, or post-consumer recovered material, or both.

"Recycled product" means a product containing recovered material, or post-consumer recovered material, or both.

The bidder agrees that preference for recycled products shall be taken into consideration to determine the low bidder in accordance with said Section and the rules promulgated, however, the award of contract will be in the amount of the bid offered exclusive any preference.

APPRENTICESHIP AGREEMENT PREFERENCE

1. If applicable to this project, any bidder seeking the preference must be a party to an apprenticeship agreement registered with the State Department of Labor and Industrial Relations (DLIR) at the time the bid is submitted for each apprenticeable trade the bidder will employ to construct the project. "Employ" means the employment of a person in an employer-employee relationship.

    a. The apprenticeship agreement shall be registered with the DLIR and conform to the requirements of Hawaii Revised Statutes Chapter 372.

    b. Subcontractors do not have to be a party to an apprenticeship agreement for the bidder to obtain preference.

    c. The bidder is not required to have apprentices in its employ at the time the bid is submitted to qualify for the preference.

2. A bidder seeking the preference must state the apprenticeable trade the bidder will employ for each trade to be employed to perform the work by submitting a completed signed original *Certification Form 1* verifying participation in an apprenticeship program registered with DLIR. "Apprenticeable trade" shall have the same meaning as "apprenticeable occupation" pursuant to Hawaii Administrative Rules (HAR) §12-30-5.

    a. The *Certification Form 1* shall be authorized by an apprenticeship sponsor listed on the DLIR list of registered apprenticeship programs. "Sponsor" means an operator of an apprenticeship program and in whose name the program is approved and registered with the DLIR pursuant to HAR §12-30-1.

    b. The authorization shall be an original signature by an authorized official of the apprenticeship sponsor.

    c. The completed signed original *Certification Form 1* for each trade must be submitted with the bid. Previous certifications shall not apply.

    d. When filling out the *Certification Form 1*, the name of Apprenticeable Trade and Apprenticeship Sponsor must be the same as recorded in the List of Construction Trades in Registered Apprenticeship Programs that is posted on the DLIR website. "Registered apprenticeship program" means a construction trade program approved by the DLIR pursuant to HAR §12-301 and §12-30-4.

    e. The *Certificate Form 1* and the List of Construction Trades in Registered Apprenticeship Programs is available on the DLIR website at: http://hawaii.gov/labor/wdd.

3. Upon receiving the *Certification Form 1*, the Procurement Officer will verify that the apprenticeship program is on the List of Construction Trades in Registered Apprenticeship Programs and that the form is signed by an authorized official of the Apprenticeship Program Sponsor. If the programs and signature are not confirmed by the DLIR, the bidder will not qualify for the preference.

4. If the bidder is certified to participate in an apprenticeship program for each trade which will be employed by the bidder for the project, a preference will be applied to decrease the bidder's bid

amount by five percent (5%) for evaluation purposes.

5. Should the bidder qualify for other preferences (e.g. Hawaii Products), all applicable preferences shall be applied to the bid price.

CONTRIBUTIONS BY STATE AND COUNTY CONTRACTORS PROHIBITED

Contractors are hereby notified of the applicability of Section 11-355, HRS, which states that campaign contributions are prohibited from specified State or county government contractors during the term of the contract if the contractors are paid with funds appropriated by a legislative body.

CONDITION OF AWARD

It is understood that the award of the contract will be made on the basis of the lowest responsible Total Base Bid (Items 1 to 11) selected by the Board of Land and Natural Resources. Write the total of bid items 1 to 11 on page P-1.

It is understood and agreed that the Board of Land and Natural Resources reserves the right to reject any and/or all bids and waive any defects when, in the Board's opinion, such rejection or waiver will be for the best interest of the State of Hawaii.

In the event all bids exceed available funds certified by the appropriate fiscal officer, the head of the purchasing agency responsible for the procurement in question is authorized in situations where time or economic considerations preclude resolicitation of work of a reduced scope to negotiate an adjustment of the bid price, including changes in the bid requirements, with the low responsible and responsive bidder, in order to bring the bid within the amount of available funds. It is understood and agreed upon that the head of the purchasing agency may delete a portion or all of any item(s) in the proposal at the stated unit or lump sum price as necessary to stay within the available funding. The bidder is responsible to make an earnest effort to represent the actual cost of each item, including all materials, labor, equipment, overhead and profit in their bid proposal to preclude claims of anticipated profit or loss of profit because of an unbalanced bid proposal.

It is also understood that if a mutually agreeable cost for the reduced scope of work necessitated by a lack of available funds cannot be agreed upon between the bidder and the head of the purchasing agency within 14 calendar days after the bid opening, then the bid may be rejected in the best interest of the purchasing agency, and the head of the purchasing agency may negotiate in progressive order (lowest to highest) with the next lowest responsible and responsive bidder.

It is also understood and agreed that the award of the contract shall be conditioned upon funds being made available for this project and further upon the right of the Board of Land and Natural Resources to hold all bids received for a period of ninety (90) days from the date of the opening thereof, unless otherwise required by law, during which time no bid may be withdrawn.

It is also understood that Notice to Proceed may be delayed up to one (1) year after the bid opening date, and that no additional compensation will be provided for any claim for escalation or delay for issuance of Notice to Proceed on or before that date.

It is also understood and agreed that the quantities given herewith are approximate only and are subject to increase or decrease, and that the undersigned will perform all quantities of work as either increased or decreased, in accordance with the provisions of the Contract Specifications.

It is also understood and agreed that the estimated quantities shown for the items for which a UNIT PRICE is asked in this Proposal are only for the purpose of comparing on a uniform basis, bids offered for the work under this contract, and the undersigned agrees that he is satisfied with and will at no time, dispute said estimated quantities as a means of claims for anticipated profit or loss of profit, because of a difference between the quantities of the various classes of work done or the materials and equipment installed, and the said estimated quantities. On UNIT PRICE bids, payment will be made only for the actual number of units incorporated into the finished project at the contract UNIT PRICE.

After the HIePRO bid due date and time, the figures will be extended and/or totaled in accordance with the bid prices of the acceptable proposals and the totals will be compared. In the comparison of bids, words written in the proposal shall govern over figures and unit prices will govern over totals. Until the award of the contract, however, the right will be reserved to reject any and all proposals and to

waive any defects or technicalities as may be deemed best for the interest of the State.

It is also understood and agreed that liquidated damages in the amount THREE HUNDRED AND NO/100 DOLLARS ($300.00) for each and every calendar day in excess thereof prior to completion of the contract shall be withheld from payments due to the Contractor.

It is also understood and agreed that if this bid is accepted, the successful bidder must enter into and execute a contract with the Board of Land and Natural Resources and furnish a Performance and Payment Bond, as required by law. These bonds shall conform to provisions of Section 103D-324 and 325, Hawaii Revised Statutes and any law applicable hereto.

It is also understood and agreed that the successful bidder will provide all necessary labor, materials, tools, equipment, and other incidentals necessary to do all the work and furnish all the materials specified in the contract in the manner and time herein prescribed, and according to the requirements of the Engineer as therein set forth.

It is understood that by submitting this proposal, the undersigned is declaring that his firm has not been assisted or represented on this matter by an individual who has, in a State capacity, been involved in the subject matter of this contract in the past two years.

It is understood that by submitting this proposal in accordance with HAR 3-122-192, the undersigned is declaring that the price submitted is independently arrived without collusion.

It is also understood that by submitting this proposal, a Certification for Safety and Health Programs for bids in excess of $100,000 (in accordance with HRS 396-18), the undersigned certifies that his organization will have a written safety and health plan for this project that will be available and implemented by the Notice to Proceed date of this project. Details of the requirements of this plan may be obtained from the Department of Labor and Industrial Relations, Occupational, Safety and Health Division (HIOSH).

It is further understood and agreed that the successful bidder shall comply with paragraph 3.1.a "SUBCONTRACTING" of the General Provisions which requires that the contractor shall perform with his own organization and with the assistance of workmen under his immediate superintendence, work of a value not less than twenty percent (20%) of the value of all work embraced in the Contract, except that certain contract items of work, if specifically referred to in the special provisions, will be exempted from said twenty percent requirement.

Compliance with §103-310 HRS. As a condition of award all bidders shall comply with all laws governing entities doing business in the State, including Chapter 237 HRS (general excise tax); Chapter 383 HRS (employment security – unemployment insurance); Chapter 386 HRS (workers compensation); Chapter 392 HRS (temporary disability insurance); and Chapter 393 HRS (pre-paid health care), and shall produce all documents to the State (DLNR, Engineering Division) required to demonstrate compliance with these subsections. Any bidder making a false affirmation or certification under this subsection shall be suspended and may be debarred from further offerings or awards pursuant to §103D-702 HRS.

RECEIPT OF ADDENDA

The bidder also acknowledges receipt of any and all addenda issued by the Engineering Division, by recording the date of receipt of the respective addenda in the space provided below:

Addendum	Date Received	Addendum	Date Received
No. 1	_____	No. 5	_____
No. 2	_____	No. 6	_____
No. 3	_____	No. 7	_____
No. 4	_____	No. 8	_____

It is understood that failure to receive any such addendum shall not relieve the Contractor from any obligation under this Proposal as submitted.

It is also understood and agreed that if this Proposal is accepted and the undersigned should fail or neglect to contract as aforesaid, the Board may determine that the bidder has abandoned the Contract, and thereupon, forfeiture of the security accompanying his proposal shall operate and the same shall become the property of the Board.

JOINT CONTRACTORS OR SUBCONTRACTORS
TO BE ENGAGED ON THIS PROJECT

The Bidder agrees that the following is a complete listing of all joint contractors or subcontractors covered under Chapter 444, Hawaii Revised Statutes (HRS), who will be engaged by the Bidder on this project to perform the required work indicated pursuant to Section 103D-302, HRS. It is the sole responsibility of the contractor to review the requirements of this Project and determine the appropriate licenses that are required to complete the Project. The Bidder certifies that the completed listing of joint contractors or subcontractors fulfills the requirements for the project and the Bidder, together with the listed subcontractors or joint contractors have all the specialty contractor's licenses to complete the work, except as provided for in HRS §103D-302(b). Failure of the Bidder to comply with this requirement may be just cause for rejection of the bid.

"A" General Engineering Contractors and "B" General Building Contractors are reminded that due to the Hawaii Supreme Court's January 28, 2002 decision in Okada Trucking Co., Ltd. v. Board of Water Supply, et al., 97 Haw. 450 (2002), they are prohibited from undertaking any work, solely or as part of a larger project, which would require the general contractor to act as a specialty contractor in any area in which the general contractor has no license. Although the "A" and "B" contractor may still bid on and act as the "prime" contractor on an "A" or "B" project (See, *HRS §*444-7 *for the definitions of an "A" and "B" project*.), respectively, the "A" and "B" contractor may only perform work in the areas in which they have the appropriate contractor's license (*An "A" or "B" contractor obtains "C" specialty contractor's licenses either on its own, or automatically under HAR § 16-77-32*). The remaining work must be performed by appropriately licensed entities.

General Engineering "A" Contractors automatically have these "C" specialty contractor's licenses: C-3, C-9, C-10, C-17, C-24, C-31a, C-32, C-35, C-37a, C-37b, C-38, C-43, C-49, C-56, C-57a, C-57b and C-61.

General Building "B" Contractors automatically have these "C" specialty contractor's licenses: C-5, C-6, C-10, C-12, C-24, C-25, C-31a, C-32a, C-42a and C-42b.

In completing the Joint Contractors or Subcontractors List, describe the specialty contractor's nature and scope of work to be performed for this project and provide the complete firm name of the joint contractor or subcontractor in the respective columns. If the Bidder is a general contractor and providing the work of the required specialty contractor, fill in the Bidder's (general contractor's) name and nature and scope of work to be performed on this project.

List only one joint contractor or subcontractor per required specialty contractor's classification, unless within the same specialty, the work of each joint contractor or subcontractor can be described so that there is no overlap in work descriptions.

If a contractor's license is required by law for the performance of the work which is called for in this bid, the bidder and all subcontractors must have the required license before the submission of the bidder's proposal in the case of a non-federal aid project, and for federal-aid projects, the bidder must have the required license prior to the award of the project and all subcontractors prior to the start of the subcontracted work.

COMPLETE FIRM NAME OF JOINT CONTRACTOR OR SUBCONTRACTOR	NATURE AND SCOPE OF WORK TO BE PERFORMED

Enclosed herewith is a:

1.	Surety Bond (*1)	)	
2.	Legal Tender (*2)	)	
3.	Cashier's Check (*3)	)	
4.	Certificate of Deposit (*3)	)	in the
5.	Certified Check (*3)	)	amount
6.	Official Check (*3)	)	of
7.	Share Certificate (*3)	)	
8.	Teller's Check (*3)	)	
9.	Treasurer's Check (*3)	)	

(Cross Out Those Not Applicable)

_____

_____Dollars ($_____)

as required by law.

Respectfully submitted,

_____
Name of Company, Joint Venture
or Partnership

_____
Contractor's License No.

By _____
Signature (*4)

Title _____
Print Name _____
Date _____
Address _____
_____
Telephone No. _____
E-Mail Address _____

NOTES:

1. Surety bond underwritten by a company licensed to issue bonds in this State;

2. Legal tender; or

3. A certificate of deposit; share certificate; or cashier's, treasurer's, teller's, or official check drawn by, or a certified check accepted by, and payable on demand to the State by a bank, a savings institution, or credit union insured by the Federal Deposit Insurance Corporation or the National Credit Union Administration.

   A. These instruments may be utilized only to a maximum of $100,000.

   B. If the required security or bond amount totals over $100,000, more than one instrument not exceeding $100,000 each and issued by different financial institutions shall be accepted.

4. Please attach to this page evidence of the authority of this officer to submit bids on behalf of the Company and also the names and residence addresses of all officers of the Company.

5. Fill in all blank spaces with information asked for or bid may be invalidated. PROPOSAL MUST BE INTACT, MISSING PAGES MAY INVALIDATE YOUR BID.

End of Proposal

SPECIAL PROVISIONS

Amend INTERIM GENERAL CONDITIONS, dated October 1994, as follows:

Section 2 – Proposal Requirements and Conditions

1. **AMEND** Section 2.1 Qualification of Bidder with the following:

Written Notice of Intent to Bid or Offer: A written Notice of Intent to Bid is not required for the Solicitation.

Standard Qualification Questionnaire: Bidders may be required to complete a standard qualifications questionnaire. When requested, the information shall be furnished within two working days or longer at the discretion of the Engineer. Failure to furnish the requested information within the time allowed may be grounds for a determination of non-responsibility, in accordance with HRS Section 103D-310 and HAR Section 3-122-108.

Hawaii Business or Compliant Non-Hawaii Business Requirement: Bidders shall be incorporated or organized under the laws of the State or be registered to do business in the State as a separate branch or division that is capable of fully performing under the contract, as stipulated in §3-122-112 HAR. A certified letter is not required prior to bid opening.

Compliance with §3-122-112 HAR: As a condition for award of the contract and as proof of compliance with the requirements of 103D-310(c) HRS, the apparent low bidder shall furnish the required documents to the Department. If the valid required certificates are not submitted on a timely basis for award of a contract, a bidder otherwise responsive and responsible may not receive the award. Bidder is responsible to apply for and submit the following documents to the Department.

A. Tax Clearance (HRS Chapter 237): Bidder shall obtain a tax clearance certificate from the Hawaii State Department of Taxation (DOTAX) and the Internal Revenue Service (IRS). The certificate is valid for six months from the most recently approved stamp date on the certificate; the certificate must be valid on the date received by the Department.

B. Department of Labor (DLIR) "Certificate of Compliance". (HRS Chapter 383 - Unemployment Insurance, Chapter 386 - Workers' Compensation, Chapter 392 - Temporary Disability Insurance, and 393 – Prepaid Health Care): Bidder shall obtain a certificate of compliance from the Hawaii State Department of Labor and Industrial relations (DLIR). The certificate is valid for six months from the date of issue; certificates must be valid on the date received by the Department.

C. Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG) "Certificate of Good Standing". Bidder shall obtain a certificate of good standing issued by the Department of Commerce and Consumer Affairs (DCCA), Business Registration Division (BREG). The certificate of good standing is valid for six months from the date of issue; certificates must be valid on the date received by the Department.

Hawaii Compliance Express. Alternately, instead of separately applying for these certificates at the various state agencies, bidder may choose to use the Hawaii Compliance Express (HCE), which allows businesses to register online through a simple wizard interface at http://vendors.ehawaii.gov to acquire a "Certificate of Vendor compliance" indicating that bidder's status is compliant with requirements of §103D-310(c), HRS, shall be accepted for contracting and final payment purposes.
Bidders that elect to use the new HCE services will be required to pay an annual fee of $15.00 to the

Hawaii Information Consortium, LLC (HIC). Bidders choosing not to participate in the HCE program will be required to provide the paper certificates as instructed in the previous paragraphs.

2. **ADD** Section 2.4a, Pre-Bid Conferences

Required Pre-bid Conferences: For construction and design-build projects with an estimated value of $500,000 or more and solicited under the competitive sealed bid method (103D-302 HRS); and for construction and design-build projects with an estimated value of $100,000 or more and solicited under the competitive sealed proposal method (103D-303 HRS); a pre-bid conference is required.

Other Pre-Bid Conferences: The Department may require a pre-bid conference for construction or design-build projects that are below the dollar threshold listed in above or when projects have special or unusual requirements.

Other Conditions: The Department may require the prospective Bidders to make a physical inspection of the project site and make attendance at the pre-bid conference a condition for submitting an offer.

Nothing stated at the pre-bid conference shall change the solicitation unless a change is made by written addendum.

3. **DELETE** Section 2.5, Addenda and Interpretations, in its entirety and replace with the following:

"Discrepancies, omissions, or doubts as to the meaning of drawings and specifications should be communicated using the question and answer section on the HIePRO solicitation for interpretation and must be received in the time frame set in the HIePRO solicitation. Any interpretation, if made and any supplemental instructions will be in the form of written addenda to the plans and specifications and made available prior to the offer due date. It shall be the prospective bidder's sole responsibility to verify and obtain any said addenda. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the contract documents."

Section 3 – Award and Execution of Contract

1. **AMEND** Section 3.3, Award of Contract, by deleting "sixty (60)" and replacing with "ninety (90)" in the first paragraph.

2. **AMEND** Section 3.3, Award of Contract, by adding the following after the first paragraph:

"If the contract is not awarded within the ninety (90) days, the Department may request the successful Bidder to extend the time for the acceptance of its bid. The Bidder may reject such a request without penalty; and in such case, the Department may at its sole discretion make a similar offer to the next lowest responsive and responsible bidder and so on until a bid is duly accepted or until the Department elects to stop making such requests."

3. **AMEND** Section 3.9, Notice to Proceed, by deleting "180 days" and replacing with "one (1) year" in the last paragraph.

4. **ADD** Section 3.10, Protests:

"**3.10 PROTESTS**—Pursuant to Section 103D-701, Hawaii Revised Statutes, an actual or prospective offeror who is aggrieved in connection with the solicitation or award may submit a protest. Any protest

shall be submitting in writing to the Chairperson, Department of Land and Natural Resources, 1151 Punchbowl Street, Honolulu, Hawaii 96813, or designee as specified in the solicitation.

A protest shall be submitted in writing within five (5) working days after the aggrieved person knows or should have known the facts giving rise thereto; provided that a protest based upon the content of the solicitation shall be submitted in writing prior to the date set for receipt of offers. Further provided that a protest of an award or proposed award shall be submitted within five (5) working days after the posting of the award of the contract.

The notice of award, if any, resulting from this solicitation shall be posted on the Procurement System on the SPO website: http://hawaii.gov/spo2/.

Section 5 – Control of Work

AMEND Section 5.8 Value Engineering Incentive by deleting "$100,000" and replacing with "$250,000" in the first paragraph.

Section 6 – Substitution of Materials and Equipment

ADD the following to Section 6.3 Sub-paragraph b:

4. If the substitution meets all the requirements of the specifications and plans.

Section 7 – Prosecution and Progress

1. **DELETE** Section 7.2d in its entirety and replace with the following:

"d. Insurance Requirements

1. Obligation of Contractor

The Contractor shall not commence any work until it obtains, at its own expense, all required insurance. Such insurance must have the approval of the Department as to limit, form and amount and must be maintained with a company authorized by law to issue such insurance in the State of Hawaii.

All insurance described herein will be maintained by the Contractor for the full period of the contract and in no event will be terminated or otherwise allowed to lapse prior to written certification of final acceptance of the work by the Department.

Certificate(s) of Insurance acceptable to the Department shall be filed with the Engineer prior to commencement of the work. These certificates shall contain a provision that coverages afforded under the policies will not be canceled or changed until at least thirty days written notice has been given to the Engineer by registered mail. The insurance policies shall name the State of Hawaii, its officers and employees as an additional insured and such coverage shall be noted on the Certificate. Should any policy be canceled before final acceptance of the work by the Department, and the Contractor fails to immediately procure replacement insurance as specified, the Department, in addition to all other remedies it may have for such breach, reserves the right to procure such insurance and deduct the cost thereof from any money due to the Contractor.

Nothing contained in these insurance requirements is to be construed as limiting the extent of Contractor's responsibility for payment of damages resulting from its operations under this contract, including the Contractor's obligation to pay liquidated damages, nor shall it affect the Contractor's separate and independent duty to defend, indemnify and hold the Department harmless pursuant to other provisions of this contract. In no instance will the Department's exercise of an option to occupy and use completed portions of the work relieve the Contractor of its obligation to maintain the required insurance until the date of final acceptance of the work.

All insurance described herein shall cover the insured for all work to be performed under the contract, all work performed incidental thereto or directly or indirectly connected therewith, including traffic detour work or other work performed outside the work area, and all change order work.

The Contractor shall, from time to time, furnish the Engineer, when requested, satisfactory proof of coverage of each type of insurance required or a copy of the actual policies covering the work. Failure to comply with the Engineer's request may result in suspension of the work, and shall be sufficient grounds to withhold future payments due the Contractor and to terminate the contract for Contractor's default.

2. Types of Insurance

The Contractor shall purchase and maintain insurance described below which shall provide coverage against claims arising out of the Contractor's operations under the contract, whether such operations be by the Contractor itself or by the subcontractor or by anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable.

(a) Worker's Compensation. The Contractor and all subcontractors shall obtain full worker's compensation insurance coverage for all persons whom they employ or may employ in carrying out the work under this contact. This insurance shall be in strict conformity with the requirements of the most current and applicable State of Hawaii Worker's Compensation Insurance laws in effect on the date of the execution of this contract and as modified during the duration of the contract.

(b) Commercial General Liability Insurance and Automobile Insurance. Contractor's commercial general liability insurance and automobile liability insurance shall both be obtained in a combined, single limit of not less than $1,000,000 per occurrence that shall include coverage for bodily injury, sickness, disease or death of any person, arising directly or indirectly out of, or in connection with, the performance of work under this contract.

The Contractor's property damage liability insurance shall provide for a single combined limit of not less than $1,000,000 for all damages arising out of injury to or destruction of property of others including the Department's, arising directly or indirectly out of or in connection with the performance of the work under this contract including explosion or collapse.

The Contractor shall either:

i. Require each of its subcontractors to procure and to maintain during the life of its subcontract, subcontractors' comprehensive general liability, automobile liability

and property damage liability insurance of the type and in the same amounts specified herein; or

ii. Insure the activities of its subcontractors in its own policy.

The Contractor will be permitted, in cooperation with insurers, to maintain a self insured retention for up to 25% of the per occurrence combined single limits of the commercial general liability and the automobile liability policies. The existence of the self insured retention must be noted on the certificate of insurance coverage submitted to the Department or else it will be understood that the insurer is providing first dollar coverage for all claims. For all claims within the self-insured retention amount, the rights, duties and obligations between the Contractor and the Department shall be identical to that between a liability insurer and the Department, as an additional insured, as if there was no self-insured retention.

(c) Builder's Risk Insurance. Unless included in the Specifications of this project, the Contractor shall not be required to provide builder's risk insurance. If required as noted in the Specifications, builder's risk insurance shall be provided during the progress of work and until final acceptance by the Department upon completion of the contract. It shall be "All Risk" (including but not limited to earthquake, windstorm and flood damage) completed value insurance coverage on all completed work and work in progress to the full replacement value thereof. Such insurance shall include the Department as additional name insured. The Contractor shall submit to the Engineer for its approval all items deemed to be uninsurable. The policy may provide for a deductible in an amount of up to 25% of the amount insured by the policy. With respect to all losses up to any deductible amount, the relationship between the Contractor and the Department shall be that of insurer and additional insured as if no deductible existed".

2. **DELETE** Section 7.16 in its entirety and replace with the following:

"RESPONSIBILITY FOR DAMAGE CLAIMS; INDEMNITY – The Contractor shall indemnify the State and the Department against all loss of or damage to the State's or the Department's existing property and facilities arising out of any act or omission committed in the performance of the work by the Contractor, any subcontractor or their employees and agents. Contractor shall defend, hold harmless and indemnify the Department and the State, their employees, officers and agents against all losses, claims, suits, liability and expense, including but not limited to attorneys' fees, arising out of injury to or death of persons (including employees of the State and the Department, the Contractor or any subcontractor) or damage to property resulting from or in connection with performance of the work and not caused solely by the negligence of the State or the Department, their agents, officers and employees. The State or the Department may participate in the defense of any claim or suit without relieving the Contractor of any obligation hereunder. The purchase of liability insurance shall not relieve the Contractor of the obligations described herein.

The Contractor agrees that it will not attempt to hold the State and its Departments and Agencies and their officers, representatives, employees or agents, liable or responsible for any losses or damages to third parties from the action of the elements, the nature of the work to be done under these specifications or from any unforeseen obstructions, acts of God, vandalism, fires or encumbrances which may be encountered in the prosecution of the work.

The Contractor shall pay all just claims for materials, supplies, tools, labor and other just claims against the Contractor or any subcontractor in connection with this contract and the surety bond will not be

released by final acceptance and payment by the Department unless all such claims are paid or released. The Department may, but is not obligated to, withhold or retain as much of the monies due or to become due the Contractor under this contract considered necessary by the Engineer to cover such just claims until satisfactory proof of payment or the establishment of a payment plan is presented.

The Contractor shall defend, indemnify and hold harmless the State and its Departments and Agencies and their officers, representatives, employees or agents from all suits, actions or claims of any character brought on account of any claims or amounts arising or recovered under the Worker's Compensation Laws or any other law, by-law, ordinance, order or decree.

Section 8 – Measurement and Payment

1. **DELETE** Section 8.7a in its entirety and replace with the following:

a. Tax Clearances from the State of Hawaii Department of Taxation and Internal Revenue Service, subject to section 103D-328, HRS, current within two months of issuance date indicating that all delinquent taxes levied or accrued under State Statutes against the contractor have been paid.

2. **ADD** Section 8.7d, Certificate of Compliance:

d. A Certification from the Contractor affirming that the Contractor has, as applicable, remained in compliance with all laws as required by Section 103D-310, HRS, and Section 3-122-112, HAR. A contractor making a false affirmation shall be suspended and may be debarred pursuant to section 103D-702, HRS.

   1. Certification of Compliance for Final Payment, State Procurement Office Form-22. Must be Signed Original.

3. **ADD** Section 8.7e, Hawaii Compliance Express:

e. In lieu of submitting the tax clearances from Taxation and IRS, and SPO Form -22, the Contractor may choose to use the Hawaii Compliance Express as described on page SP-1 of this Special Provisions.

TABLE OF CONTENTS

SECTION 01019

GENERAL SPECIFICATIONS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

Work shall consist of furnishing all labor, tools, materials and equipment necessary and required to construct in place complete all work as indicated on the drawings and as specified herein.

1.2 GENERAL

A. Construction Lines, Levels and Grades: The Contractor shall verify all lines, levels and elevations indicated on the drawings before any clearing, excavation or construction begins. Any discrepancy shall be immediately brought to the attention of the Engineer, and any change shall be made in accordance with the Engineer's instruction. The Contractor shall not be entitled to extra payment for failing to report the discrepancies before proceeding with any work whether within the area affected or not.

B. Examination of Premises: The Contractor shall contact the Engineer and obtain permission before visiting the site.

C. Notices: The Contractor shall coordinate with and notify the Engineer and Construction Manager before starting any work.

D. Disruption of Utility Services: Contractor shall coordinate with the Construction Manager prior to any temporary shutdown of the irrigation system. All work related to the temporary disconnection of electrical system shall be pre-arranged with the Engineer so that any disruption of such services will be kept to a minimum. In the event temporary power hook-up is required, the Contractor shall provide the necessary services.

E. Contractor's Operations

1. The Contractor must employ, insofar as possible, such methods and means of carrying out the work so as not to cause any interruption or interference to the facility's operations. Where the Contractor's operations would result in interruptions which would hamper the operations of the facilities, the Contractor shall rearrange the schedule of work accordingly.

2. The Contractor shall maintain safe passageway to and from the facility's occupied rooms and other occupied spaces for the user agency personnel and the public at all times.

F. Contractor Use of Premises

1. The Contractor shall review the applicable asbestos survey reports and insure that he fully understands their contents as to whether and where there may be asbestos containing materials (ACM) in the building(s) in which he will be working.

2. The Contractor shall inform its employees, subcontractors and all other persons engaged in the project of the presence (as applicable) of asbestos in the existing buildings at the job site in accordance with the requirements of Chapter 110, Article 12-110-2 (f) (1) (B) of the Occupational Safety and Health Standards, State of Hawaii.

3. In the event the Contractor, its subcontractor(s) and/or other persons engaged in the project must work in any building(s) on the site other than the one(s) designated in the project, the Contractor shall request copies of the asbestos survey report(s) for the building(s) from the Engineer and notify all persons as indicated in Item 2 above.

G. Parking Policy for Contractor

Areas to be used by the Contractor shall be as designated by the Engineer. Any lawn damaged by the Contractor shall be restored as instructed by the Engineer at no cost to the State.

H. Toilet Accommodations: The following requirements of the State Department of Health (DOH) must be strictly adhered to in the Forest Reserve area:

1. Portable covered receptacles for fecal matter and urine, of the design and number specified by the DOH, shall be provided.

2. No employee will be allowed to deposit fecal matter or urine in any place except in these receptacles. Any infringement of this requirement shall result in immediate transfer or discharge of the offender or other disciplinary measures satisfactory to the Engineer.

3. All deposits in these receptacles shall be immediately covered with a chemical solution prescribed by the DOH. These receptacles, with their contents, shall be collected and removed for disposal at the close of each working day. The method of disposal must be satisfactory to the DOH to prevent contamination of any water supply, stream or other bodies of water.

4. The receptacles shall be thoroughly cleaned with water and the required chemical solution and then returned to the required places for service.

I. Protection of Property: The Contractor shall continually maintain adequate protection of all its work from damage and shall protect all property, including but not limited to buildings, equipment, furniture, grounds, vegetation, material, utility systems located at and adjoining the job site. The Contractor shall repair, replace or pay the expense of repair of damages resulting from its operations.

J. Use of Power Driven Equipment: The Contractor is cautioned to take all necessary safety precautions to protect the facility personnel, and the public whenever power driven equipment is used.

K. Safety: The Contractor shall carefully read and strictly comply with the requirements of the Hawaii Occupational Safety and Health Law, Chapter 396, Hawaii Revised Statutes, as amended, is applicable and made a part of the Contract.

L. Clean Up Premises: The Contractor shall clean up and remove from premises all debris accumulated from operations as necessary or as directed. See also Section 7.25 of the General Conditions.

M. Responsibility

1. The State will hold the Contractor liable for all the acts of Subcontractors and shall deal only with the prime Contractor in matters pertaining to other trades employed on the job. The Contractor shall be responsible for coordinating the work of all trades on the job.

2. Should the Contractor discover any discrepancy in the plans or specifications, the Contractor shall immediately notify the Engineer before proceeding any further with the work, otherwise, the Contractor will be held responsible for any cost involved in correction of work placed due to such discrepancy.

N. Cooperation With Other Contractors: The State reserves the right at any time to contract for or otherwise perform other or additional work within the contract zone limits of this Contract. The Contractor of this project shall, to the extent ordered by the State, conduct its work so as not to interfere with or hinder the progress or completion of the work performed by other contractors.

O. Division of the Work: The Divisions and Sections into which these Specifications are divided shall not be considered an accurate or complete segregation of work by trades. This also applies to all work specified within each Section.

P. Drawings and Specifications

1. The Contractor shall not make alterations in the drawings and specifications. In the event the Contractor discovers any errors or discrepancies, the Contractor shall immediately notify the Engineer in accordance with the General Conditions.

2. Where devices, or items, or parts thereof are referred to in the singular, it is intended that such reference shall apply to as many such devices, items or parts as are required to properly complete the work.

3. Specifications and drawings are prepared in abbreviated form and include incomplete sentences. Omission of words or phrases such as "the Contractor shall", "as shown on the drawings", "a", "an", and "the" are intentional. Omitted words and phrases shall be provided by inference to form complete sentences.

Q. Required Submittals

1. Required submittals as specified in the Technical Sections of these specifications include one or more of the following: color samples; material samples; technical data; schedules of materials; schedules of operations; guarantees; operating and maintenance manuals; and as-built drawings.

2. The Contractor shall make a comprehensive list of the required submittals, by Specification Section, and submit this list to the Engineer within 15 days after notice to proceed.

3. As-Built Drawings: When as-built drawings are required for submittal, the following shall apply:

   a. As-built drawings, the intent of which is to record the actual in-place construction so that any future renovations or tie-ins can be anticipated accurately, shall be required.
   b. All deviations from alignments, elevations and dimensions which are stipulated on the plans shall be recorded in red on the as-built drawings.

   c. The following procedure shall be followed:

      1) Immediately after these changes are constructed in place, the Contractor shall record them on the field office plans.

      2) Within two weeks after final inspection of the project, the Contractor shall transfer the changes marked on the field office plans onto a clean copy of plans using a red pencil. Any deletions shall be so noted and redrawn as necessary. The

Contractor shall stamp or mark the tracings "AS-BUILT", and also sign and date each drawing so marked.

3) The Contractor shall submit the as-built drawings together with the marked-up field office plans to the Engineer.

4) Any as-built drawing which the Engineer determines does not accurately record the deviation shall be corrected by the State, and the Contractor shall be charged for the services.

END OF SECTION

SECTION 01090

STANDARD REFERENCES

PART 1 - GENERAL

Wherever used in the project, the following abbreviations will have the meanings listed:

Abbreviation	Company
AA	Aluminum Association Incorporated 818 Connecticut Avenue, N.W. Washington, D.C. 20006
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, N.W., Suite 225 Washington, D.C. 20001
ACI	American Concrete Institute P.O. Box 19150 Detroit, MI
AEIC	Association of Edison Illuminating Companies 51 East 42nd Street New York, NY 10017
AFBMA	Anti-Friction Bearing Manufacturer's Association 60 East 42nd Street New York, NY 10017
AGA	American Gas Association 8501 East Pleasant Valley Road Cleveland, OH 44131
AGMA	American Gear Manufacturer's Association 1330 Massachusetts Avenue, N.W. Washington, D.C.
AISC	American Institute of Steel Construction 101 Park Avenue New York, NY 10017
AISI	American Iron and Steel Institute 1000 16th Street, N.W. Washington, D.C. 20036

Abbreviation	Company
AITC	American Institute of Timber Construction 333 West Hampden Avenue Englewood, CO 80110
AMCA	Air Moving and Conditioning Association, Inc. 30 West University Drive Arlington Heights, IL 60004
ANSI	American National Standards Institute, Inc. 1430 Broadway New York, NY 10018
APA	American Plywood Association 1119 A Street Tacoma, WA 98401
API	American Petroleum Institute 1801 K Street N.W. Washington, DC 20006
ARI	Air-Conditioning and Refrigeration Institute 1814 North Fort Myer Drive Arlington, VA 22209
ASCE	American Society of Civil Engineers 345 East 47th Street New York, NY 10017
ASCII	American Standard Code for Information Interchange United States of America Standards Institute 1430 Broadway New York, NY 10018
ASE Code	American Standard Safety Code for Elevators, Dumbwaiter and Escalators American National Standards Institute 1430 Broadway New York, NY 10018
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers United Engineering Center 345 East 47th Street New York, NY 10017

Abbreviation	Company
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWPA	American Wood Preservers Association 1625 Eye Street Washington, DC 20006
AWS	American Welding Society 2501 N.W. 7th Street Miami, FL 33125
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
CBM	Certified Ballast Manufacturers 2120 Keith Building Cleveland, OH 44115
CMAA	Crane Manufacturers Association of American, Inc. (Formerly called: Overhead Electrical Crane Institute - OECI) 1326 Freeport Road Pittsburgh, PA 15238
CRSI	Concrete Reinforcing Steel Institute 180 North La Salle Street Chicago, IL 60601
CSA	Canadian Standards Association 178 Rexdale Boulevard Rexdale, Ontario, M9W IR3, Canada
DEMA	Diesel Engine Manufacturer's Association 122 East 42nd Street New York, NY 10017
DIS	Division of Industrial Safety California Department of Industrial Relations

Abbreviation	Company
	2422 Arden Way Sacramento, CA 95825
EEI	Edison Electric Institute 90 Park Avenue New York, NY 10016
EIA	Electronic Industries Association 2001 Eye Street N.W. Washington, DC 20006
EJMA	Expansion Joint Manufacturer's Association 331 Madison Avenue New York, NY 10017
ESO	Electrical Safety Orders, California Administrative Code, Title 8, Chap. 4, Subarticle 5 Office of Procurement, Publications Section P.O. Box 20191 8141 Elder Creek Road Sacramento, CA 95820
FEDSPEC	Federal Specifications General Services Administration Specification and Consumer Information Distribution Branch Washington Navy Yard, Bldg. 197 Washington, DC 20407
FEDSTDS	Federal Standards (see FEDSPECS)
FM	Factory Mutual Research 1151 Boston-Providence Turnpike Norwood, MA 02062
HEI	Heat Exchange Institute 122 East 42nd Street New York, NY 10017
HI	Hydraulic Institute 1230 Keith Building Cleveland, OH 44115

Abbreviation	Company
IAPMO	International Association of Plumbing and Mechanical Officials 5032 Alhambra Avenue Los Angeles, CA 90032
ICBO	International Conference of Building Officials 5360 South Workman Mill Road Whittier, CA 90601
ICEA	Insulated Cable Engineers Association P.O. Box P South Yarmouth, MA 02664
IEEE	Institute of Electrical and Electronics Engineers, Inc. 345 East 47th Street New York, NY 10017
IES	Illuminating Engineering Society C/O United Engineering Center 345 East 47th Street New York, NY 10017
ISA	Instrument Society of America 400 Stanwix Street Pittsburgh, PA 15222
JIC	Joint Industrial Council 7901 Westpark Drive McLean, VA 22101
MILSPEC	Military Specifications Naval Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. 127 Park Street, N.E. Vienna, VA 22180

Abbreviation	Company
NAAMM	National Association of Architectural Metal Manufacturers 100 South Marion Street Oak Park, IL 60302
NACE	National Association of Corrosion Engineers P.O. Box 986 Katy, TX 77450
NEC	National Electric Code National Fire Protection Association 470 Atlantic Avenue Boston, MA 02210
NEMA	National Electrical Manufacturer's Association 155 East 44th Street New York, NY 10017
NESC	National Electric Safety Code American National Standards Institute 1430 Broadway New York, NY 10018
NFPA	National Forest Products Association (Formerly called: National Lumber Manufacturer's Association) 1619 Massachusetts Avenue, N.W. Washington, DC 20036
OSHA	Occupational Safety and Health Act U.S. Department of Labor San Francisco Regional Office 450 Golden Gate Avenue, Box 36017 San Francisco, CA 94102
PPIC	The Plumbing & Piping Industry Council, Inc. Suite 402 510 Shatto Place Los Angeles, CA 90020
SAE	Society of Automotive Engineers 2 Pennsylvania Street New York, NY 10001

SAMA	Scientific Apparatus Makers Association One Thomas Circle Washington, DC 20005
SBCC	Southern Building Code Congress 1116 Brown-Marx Building Birmingham, AL 35203
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Inc. 8224 Old Courthouse Road Tysons Corner Vienna, VA 22180
SSPWC	Standard Specifications for Public Works Construction Building News, Inc. 3055 Overland Avenue Los Angeles, CA 90034
TEMA	Tubular Exchanger Manufacturer's Association 331 Madison Avenue New York, NY 10017
UBC	Uniform Building Code Published by ICBO
UL	Underwriters Laboratories Inc. 207 East Ohio Street Chicago, IL 60611
UMC	Uniform Mechanical Code Published by ICBO
UPC	Uniform Plumbing Code Published by IAPMO
USBR	Bureau of Reclamation U.S. Department of Interior Engineering and Research Center Denver Federal Center, Building 67 Denver, CO 80225
WWPA	Western Wood Products Association (Formerly called: West Coast Lumberman's Association - WCLA) Yeon Building Portland, CA 97204

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.1 SUBMITTALS

A. Required submittals shall include:

1. Manufacturer's Data.

2. Certificates of Warranty.

3. Any others as called for in the plans, specifications, or by the Engineer.

1.2 BIDDER'S SPECIAL RESPONSIBILITY FOR COORDINATING CONTRACTUAL WORK AND SUBMITTALS:

A. The Contractor is responsible for the coordination of all contractual work and submittals.

B. The Contractor shall have a rubber stamp made up in the following format:

CONTRACTOR NAME

PROJECT: _____

_____

JOB NO: _____

THIS SUBMITTAL HAS BEEN CHECKED BY THIS GENERAL CONTRACTOR. IT IS CERTIFIED CORRECT, COMPLETE, AND IN COMPLIANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS. ALL AFFECTED CONTRACTORS AND SUPPLIERS ARE AWARE OF, AND WILL INTEGRATE THIS SUBMITTAL INTO THEIR OWN WORK.

DATE RECEIVED _____
SPECIFICATION SECTION _____
SPECIFICATION PARAGRAPH _____
DRAWING NUMBER _____
SUBCONTRACTOR NAME _____
SUPPLIER NAME _____

MANUFACTURER NAME _____

CERTIFIED BY: _____

C. This stamp, "filled in", should appear on the title sheet of each shop drawing, on a cover sheet of submittals in an 8-1/2" x 11" format, or on one face of a cardstock tag (min. 3" x 6") tied to each sample. The tag on the samples should state what the sample is so that, if the tag is accidentally separated from the sample, it can be matched up again. The back of this tag will be used by the Engineer for his receipt, review, and log stamp and for any comments that relate to the sample.

D. All submittals for material listed in the contract documents shall be required and shall be reviewed by the Engineer, prior to any ordering of materials.

E. Unless otherwise noted, the Contractor shall submit electronic PDF copies to the Engineer for review.

F. The review of submittals by the Engineer shall not relieve the Contractor from responsibility for correctness of the dimensions, fabrication details, and space requirements or for deviations from the contract drawings and specifications, unless the Contractor has called attention to such deviations, in writing, by a letter accompanying the drawings and the Engineer approved the change or deviations, in writing, at the time of submission; nor shall review by the Engineer relieve the Contractor from the responsibility for errors in the shop drawings. When the Contractor does call such deviations to the attention of the Engineer, he shall state in his letter whether or not such deviations involve any deduction or extra cost adjustment.

G. The approval of the above submittals or other data shall in no way release the Contractor from his responsibility for the proper fulfillment of the requirements of this contract nor for fulfilling the purpose of the installation nor from his liability to replace the same should it prove defective or fail to meet the specified requirements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01505

MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS:

This section covers the requirements for mobilization and demobilization.

1.02 MOBILIZATION:

Mobilization shall consist of the transporting, assembling, constructing, installing, and making ready for use at the job site, all the equipment, machinery, structures, utilities, materials, labor, and incidentals necessary to do the work covered by this contract.

1.03 DEMOBILIZATION:

Demobilization shall consist of the dismantling and removal of the above-mentioned equipment, machinery, structures, utilities, materials, and incidentals, and the cleaning up of the site.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GUIDELINES:

If the Contractor utilizes private lands other than the sites provided by the State for mobilization purposes, the provisions of this section shall apply, and the mobilization and demobilization work on said private lands shall be in accordance with the agreement between the Contractor and the land owner.

Any and all additional mobilization or demobilization costs in excess of the maximum amounts specified in the Proposal shall be included in the appropriate unit prices bid in the Proposal. The Contractor shall not receive any compensation for mobilization and demobilization in addition to those specified in the Proposal.

All equipment, machinery, buildings, utilities and incidentals mobilized and demobilized under this section shall remain the property of the Contractor.

PART 4 – MEASUREMENT AND PAYMENT

Mobilization and Demobilization will be paid on a lump sum basis and shall not exceed 10% of the total bid price. Measurement for payment will not apply. Payment will be full compensation for the work prescribed in this section and the contract documents.

END OF SECTION

SECTION 02050

EROSION CONTROL

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Temporary and permanent erosion control systems as well as any other slope protection procedures called for on the plans.

1.2 SUBMITTALS

A. Furnish manufacturer's documentation to the Engineer that the materials meet the requirements listed herein. Provide the mill certificate, signed by a legally authorized officer from the manufacturer for each consignment. The mill certificate shall state that the material in that shipment meets the requirements listed herein and provide proof of test results for minimum roll values.

B. Upon request by the Engineer, supply product samples prior to acceptance of the material. Engineer reserves the right to perform acceptance tests on the samples prior to acceptance of the material. The Engineer reserves the right to collect samples periodically during installation for confirmation testing.

C. A BMP Plan shall be reviewed and approved by the Engineer prior to installation of erosion control measures.

1.3 DELIVERY, HANDLING, AND STORAGE

A. Deliver material to the project site in such quantities and at such times to assure the continuity of the installation. Protect material during on-site storage.

1.4 ENVIRONMENTAL REQUIREMENTS

A. The Contractor shall protect adjacent properties and water resources from erosion and sediment damage in accordance with the Contract Documents.

B. The general contractor will be required to designate, by name, a certified staff person for implementation of all erosion control measures for this project. Specific responsibilities will include:

1. Assuring and certifying the contractor's construction sequence is in conformance with the specified schedule. A weekly certification stating compliance, any deviations, and corrective measures shall be filed with the Engineer.

2. Inspection of the project work site on a weekly basis, with the installation of added erosion control measures in areas which appear vulnerable to erosion.

3. Inspection of all erosion control measures after any significant rainfall. Accumulated silt/sediment should be removed when the depth of sediment reaches 50% of the barrier height. Accumulated silt/sediment should be removed from behind silt fencing when the depth of the sediment reaches 6 inches. A significant rainfall shall be defined as over 1/2 inch of precipitation in any consecutive 24 hour period.

PART 2 – PRODUCTS

2.1 EROSION CONTROL MATERIALS

A. Hydro-seed. Hydro-seed materials shall be as specified in the plan notes.

B. Compost filter socks. Compost filter socks shall be as shown on the erosion control plan.

C. Crushed rock and geotextile fabric for construction ingress/egress. Construction ingress/egress shall be as shown on the erosion control plan.

PART 3 – EXECUTION

3.1 PREPARATION

A. Site erosion control plans/details shall be used as a guide and implemented as a minimum. Contractor shall assess the site and submit a BMP plan for review and approval prior to starting work.

B. Deficiencies or changes in the erosion control plan as it is applied to current conditions will be brought to the attention of the Engineer for remedial action.

3.2 EROSION CONTROL AND SLOPE PROTECTION IMPLEMENTATION

A. Place erosion control systems in accordance with the erosion control plan and in accordance with approved installation procedures.

B. The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations. The Engineer has the authority to direct the Contractor to provide immediate permanent or temporary pollution control measures. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practical time to minimize the need for temporary controls.

C. Erosion control measures for grading shall include vegetative cover by means of hydro-seeding where called for in the contract documents. See plan notes for details regarding temporary and permanent vegetative cover including seed material.

D. The temporary erosion control systems installed by the Contractor shall be maintained as directed by the Engineer to control siltation at all times during the life of the Contract. The Contractor must respond to any maintenance or additional work ordered by the Engineer within a 48 hour period.

E. Any additional material work required beyond the extent of the erosion control plan shall be paid for by the Owner except where such measures are required to correct deficiencies caused by the failure of the Contractor to construct the work in accordance with the erosion sediment control plan.

F. Slopes that erode easily shall be temporarily seeded as the work progresses with a cereal grain of wheat, rye or oats.

G. All disturbed areas shall be restored upon completion of the work.

3.3 COMPOST FILTER SOCK INSTALLATION

A. Compost filter socks shall be installed to the extents shown in the contract documents. Clear alignment of shrubs, trees, boulders, and other debris where alignment is defined.

B. Installation shall be done according to the manufacturer's recommendations and the erosion control plan. Discrepancies shall be brought to the attention of the Engineer for clarification.

C. Compost filter socks shall be anchored and/or stabilized using wooden stakes or other approved methods. Overlap as required.

D. Inspection and maintenance shall be performed according to the erosion control plan.

3.4 CONSTRUCTION INGRESS/EGRESS INSTALLATION

A. Excavate areas for construction ingress/egress to the extents shown in contract documents. Contractor shall exercise care not to damage existing roadways or adjacent property.

B. Rough grade the area to relatively even surface.

C. Place geotextile filter fabric. Spread fabric evenly and smoothly over the area and overlap fabric sheets as needed and required by the contract documents.

D. Place crushed rock on filter fabric. Distribute and compact to create an even surface and smooth transition to the surrounding grade.

3.5 MEASUREMENT AND PAYMENT

Erosion Control will be paid on a lump sum basis. Measurement for payment will not apply. Payment will be full compensation for the work prescribed in this section and the contract documents.

END OF SECTION

SECTION 02100

SITE PREPARATION

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

The work to be performed under this section shall include clearing the premises of all obstacles and obstructions, the removal of which will be necessary for the proper reception, construction, execution and completion of the other work included in this contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. Install erosion control and best management practices prior to any ground disturbing activities.

B. Maintenance of Traffic: The Contractor shall conduct operations with minimum interference to streets, driveways, sidewalks, passageways, etc.

When necessary, the Contractor shall provide and erect barriers, etc., with special attention to protection of the public and personnel.

C. Protection: Throughout the progress of the work protection shall be provided for all property and equipment, and temporary barricades shall be provided as necessary. Work shall be done in accordance with the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, and the State of Hawaii's Occupational Safety and Health Standards, Rules and Regulations.

D. Fires: No burning of fires of any kind will be allowed.

E. Reference Points: Bench marks, etc., shall be carefully maintained, but if disturbed or destroyed, shall be replaced as directed, at the Contractor's expense.

F. Disposal: All materials resultant from operations under this Section shall become the property of the Contractor and shall be removed from the site. Loads of materials shall be trimmed to prevent droppings.

3.02 EXISTING UTILITY LINES

The existence of active underground utility lines within the construction area is not definitely known other than those indicated in their approximate locations on the Drawings. Should any unknown line be encountered during excavation, the Contractor shall immediately notify the Engineer of such discovery. The Engineer shall then investigate and issue instructions for the preservation or disposition of the unknown line. Authorization for extra work shall be issued by the Engineer only as he deems necessary.

3.03 CLEARING AND GRUBBING

A. The Contractor shall clear and grub the premises in accordance with Section 02110 – Clearing and Grubbing, and to the extent required by the contract documents.

B. All trees and vegetation shall be chipped onsite and used as mulch covering for erosion control and restoration of the site. This work shall be at no additional cost to the State.

C. Large logs, stumps and all other materials that cannot be chipped shall be disposed of in accordance with applicable regulations at an approved disposal site at no additional cost to the State.

3.04 CLEAN UP OF PREMISES

Clean up and remove all debris accumulated from building operations from time-to-time as directed. Upon completion of the construction work and before final acceptance of the contract work, remove all surplus materials, equipment, scaffoldings, etc., and leave entire job site raked clean and neat to the satisfaction of the Engineer.

PART 4 – MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

Site Preparation will not be measured for payment.

4.02 PAYMENT

Site Preparation will not be paid separately. The cost will be considered incidental to various contract items.

END OF SECTION

SECTION 02110

CLEARING AND GRUBBING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

This section covers the requirements for clearing and grubbing, within the areas shown on the plan or as directed by the Engineer. The above work shall include the removal and disposal of trash, litter and all other debris encountered on the project. Also included is the protection from injury or defacement of trees and other objects designated to remain and treatment or removal of damaged trees.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CLEARING AND GRUBBING WORK:

A. The areas for clearing and/or grubbing shall be to the limits of disturbance shown on the plans or as noted on the plans.

B. Clear and grub all trees, tree stumps, and vegetation for areas that require excavation or grading, to the limits of the improvements.

C. Trees with major roots exposed by construction that are rendered unstable shall be felled and disposed of as specified herein at no further cost to the State.

D. Felling, cutting, and trimming methods shall not cause bark damage to standing timber. If damage does occur to standing trees, the injured area shall be treated with a coat of treesurgery asphalt-based paint.

E. The Contractor shall protect from injury and damage all surrounding trees, plants, etc., and shall leave all in as good as condition as at present. Any damage to existing improvements shall be repaired or replaced by the Contractor to the satisfaction of the Engineer.

F. Clear and grub to provide access to construction areas, drives, and where grade is to be razed of shrubs, trees, stumps, vegetation, rubbish, and other perishable or objectionable matter.

G. Do not remove vegetation or cut down trees not located within limits of excavation, clearing, grubbing or grading, as indicated on drawings, unless approved by the Engineer.

3.2 DISPOSAL

A. All trees and vegetation shall be chipped onsite and used as mulch covering for erosion control and restoration of the site. This work shall be at no additional cost to the State.

B. Large logs, stumps and all other materials that cannot be chipped shall be disposed of in accordance with applicable regulations at an approved disposal site at no additional cost to the State.

3.3 MEASUREMENT AND PAYMENT

Clearing and grubbing will be paid for on a lump sum basis. Measurement for payment will not apply. Payment will be full compensation for the work prescribed in this section and the contract documents.

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

This section covers the requirements for earthwork, including excavation for grouted riprap, gravel roads, staging areas, and grading.

It shall be the responsibility of the Contractor to examine the project site and determine for himself the existing conditions. Obvious conditions of the site existing on the date of the bid opening shall be accepted as part of the work, even though they may not be clearly indicated on the drawings and/or described herein or may vary therefrom.

1.2 WORK INCLUDES

A. Excavating, separating, hauling, stockpiling, backfilling, compacting, and grading of soils and gravel.

B. The excavation of all material encountered within the limits of work, the on-site placement or the stockpiling of suitable site material, and the satisfactory disposal of unsuitable site material such as rock, rubble, rubbish and any surplus suitable site material.

1.3 REMOVAL AND REPAIR WORK

The Contractor shall exercise every precaution to preserve and protect all structures, pavements, fences, gates, walkways or utility improvements, and landscaping which are to remain. All damages shall be repaired and restored to original or better condition upon completion of the work at no additional cost to the State.

1.4 SEQUENCE OF WORK

All sequence of work shall be subject to the approval of the Engineer.

1.5 PROTECTION

A. Barricade: Temporary barricades shall be as specified in Section 01530 – Barricades.

B. Take all precautions and safety measures as required to protect the State of Hawaii free and harmless from liability of any kind. Conduct operations with minimum interference to streets, driveways, passages, etc.

C. Adequate precautions shall be taken before commencing and during the course of the work to ensure the protection of life, limb, and property.

D. The Contractor shall protect from damage all surrounding structures, trees, plants, grass, walks, pavements, etc. that are to remain. Any damage will be repaired or replaced by the Contractor to the satisfaction of the Engineer at no additional cost to the State.

1.6 PERMITS

A. The Contractor shall apply, obtain, and pay for all necessary permits prior to the commencement of work, and shall comply with applicable permits during construction.

1.7 CONSTRUCTION LINES, LEVELS AND GRADES

A. The Contractor shall verify all lines, levels and elevations indicated on the drawings before any clearing, excavation or construction begins. Any discrepancy shall be immediately brought to the attention of the Engineer and any changes shall be made in accordance with his instructions. The Contractor shall not be entitled to extra payment if he fails to report the discrepancies before proceeding with any work whether within the area affected or not.

B. The laying out of base lines, establishment of grades and staking out the entire work shall be done by a licensed Surveyor or a licensed Civil Engineer, registered in the State of Hawaii. He shall be solely responsible for their accuracy. Erect and maintain substantial batter boards showing construction lines and levels.

1.8 CLEANUP

Clean up and remove all debris accumulated from construction operations from time to time, and as directed by the Engineer. Upon completion of the construction work and before final acceptance of work, remove all surplus materials, equipment, etc. and leave entire jobsite clean and neat.

1.9 REFERENCES

A. Latest version of American Society for Testing and Materials (ASTM) standards:

1. ASTM D 698, Standard Test Method for Laboratory Compaction of Soil using Standard Effort (12,400 ft-lb/ft^3 [600kN-m/m^3)

2. ASTM D 1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft^3 [2,700 kN-m/m^3]).

3. ASTM D 2216, Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock.

4. ASTM D 2487, Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

5. ASTM D 4220, Standard Practices for Preserving and Transporting Soil Samples.

6. ASTM D 6913, Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis.

7. ASTM D 6938, Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

B. OSHA 29 CFR Part 1926, Occupational Safety and Health Standards – Excavations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All earthwork material shall conform to the HDOT Standard Specifications, unless stated otherwise on the plans.

PART 3 - EXECUTION

3.1 EXCAVATION

Excavation shall be done to the lines and grades indicated. Excavated materials declared unusable by Engineer shall be removed from the site at the Contractor's expense.

3.2 GRADING

The project site shall be graded to finish and existing grade. Grading shall conform with the ordinances of the applicable County issuing the Grading Permit and as amended. Topsoil shall be spread evenly, compacted lightly and raked to a uniform place at required contours and grades.

3.3 EMBANKMENT

A. Work shall consist of clearing, excavating, filling, and grading as necessary to construct the site per the Contract Documents.

B. Embankment construction shall include the placing of suitable earth fill in the locations stipulated in the construction drawings to obtain the required lines, grades

and cross-sections shown on the drawings. Materials shall be deposited and spread in uniform layers of specified thickness, for the full width of the embankment. Each layer shall be shaped to line and cross-section and thoroughly compacted before the succeeding layer is placed.

C. Where embankment is being placed on side fill or sloping sections, the lower portion shall be constructed as above, until a full width surface of the specified cross-section is obtained. The embankment shall be completed thereafter with full width layers.

D. Contractor shall remove existing vegetation over the areas that are to receive earth materials.

3.4 MATERIAL PLACEMENT

A. Inspect subgrade before placement of earth materials.

B. Maintain lifts to provide positive drainage away from construction.

C. Do not place materials such as stumps, logs, brush, or other undesirable materials over the slopes or within the embankment.

3.5 COMPACTION

A. Earth materials shall be spread and bladed smooth in successive layers not exceeding 8 inches in loose thickness to the full width of the cross-section, unless otherwise directed by the Engineer.

B. Each layer of earth materials shall be compacted to a minimum of ninety five (95%) of Modified Proctor Density. The material shall be compacted at the optimum moisture content, or up to two percent (2%) higher than optimum, as directed by the Engineer.

C. Compaction testing is required. Subgrade shall be inspected by the Engineer in the field.

D. All sampling and testing shall be performed by an independent testing agency and all test results submitted to the Engineer for approval. All cost of sampling and testing shall be borne by the Contractor.

3.6 CONTROL OF MOISTURE CONTENT

A. The moisture content of the earth materials used for construction shall be such that the specified compaction can be obtained with the equipment used. The moisture content of the fill shall be maintained within the limits to:

1. Prevent the bulking of the material under the action of the hauling or compaction equipment,

2. Prevent adherence of the fill material to the equipment,

3. Ensure the crushing and blending of the soil clods and aggregation into a homogeneous mass, and

4. Contain adequate moisture so that a sample can be hand molded.

B. Do not compact embankment material if the moisture content causes excessive rutting by the hauling equipment, or excessive displacement or distortion under the compacting equipment. If these conditions exist, allow the materials to dry before compacting. If necessary, accelerate drying the materials by aerating or by using blade graders, harrows, discs, or other appropriate equipment to manipulate the material. No additional compensation will be provided for soil conditioning or use of additives to attain required percent moisture.

3.7 FINAL GRADE

A. The Contractor shall, as soon as practicable, bring the site grades to the correct widths, lines and elevation as shown on the drawings.

B. All surfaces shall be maintained to the specified grade and cross-section and to the specified density until the project or that portion of the project is accepted.

3.8 VEGETATIVE COVER

Graded areas shall receive vegetative cover where specified in the plans. See Section 02050 – Erosion Control and plan notes for details.

3.9 MEASUREMENT AND PAYMENT

Earthwork will be paid on a lump sum basis. Measurement for payment will not apply. Payment will be full compensation for the work prescribed in this section and the contract documents.

END OF SECTION

SECTION 02220

SITE DEMOLITION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

This section describes demolition work as stated in the contract documents.

1.2 DESCRIPTION

Work under this section includes, but is not limited to, demolition of existing irrigation ditches and any other as described in the contract documents.

1.3 SUBMITTALS

A. Submit a demolition work plan to coordinate work with the Officer-in-Charge.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

A. Existing Conditions

1. The Drawings show general information only. Examine the site to determine the exact existing conditions and character and extent of the work to be performed and demolition operations required to complete the new work.

2. The failure or omission of the Contractor to visit the site and acquaint himself with the existing conditions shall in no way relieve him from obligations with respect to his bid or to his Contract.

B. Existing Utilities

1. Existing underground lines shown on the Drawings are shown from the best possible information available. Verify all utility line locations prior to the start of any work.

2. It is understood and agreed that certain lines cannot be or have not been located and no indication is contained on any of the Drawings or referred to in the specifications (i.e. storm drainage, electrical, plumbing, sewer, water, or telephone); therefore, exercise extreme caution during demolition and like work. Should any such lines encountered, written notice shall be given to the Officer-in-Charge, and no further work in the area shall proceed until adequate investigation

has been made, the line identified, and instructions are issued as to how to proceed.

3. The Contractor shall be liable for any and all damages associated with his activities which may disrupt services as a result or any utility line damage.

C. Barricades

Provide barricades, warning (signs and lighting), and maintenance and supervision thereof, in accordance with applicable Federal, State and local codes, or as may be directed from time to time.

D. Equipment

The use of proper equipment is the responsibility of the Contractor.

E. Protection of Property

Existing appurtenances and improvements, which are to remain, shall be protected from damage due to work under this section.

F. Protection of Utilities

Preserve in operating condition all active utilities traversing or within and about the site; protect all such property and items, including but not limited to piping, mains, laterals, valve boxes, meters, and other appurtenances and structures. Promptly repair and notify the affected utility company of any damage to such utility or work caused by work under this Contract.

G. Protection of Trees and Plant Materials to Remain

Tree protection shall be as described in the plan notes.

3.2 DEMOLITION

Demolition activities shall be performed in the manner stated and to the extents specified in the approved demolition plan. All BMP and safety measures shall be in place prior to the start of demolition work.

A. Irrigation Ditch Demolition

1. Remove from site to the limits shown in the plans.

2. Remove material so as to prevent damage to adjacent ditches and existing structures which are to remain. The Contractor shall at his expense remove and replace damages outside the limits of removal.

3. Reuse of demolished stone as grouted riprap shall be permitted. Reused stone

shall meet the requirements stated in Section 02271 – Grouted Riprap.

B. Gates, Posts, Utilities and Other Structures

Demolish existing structures and utilities where shown in the contract documents. Remove all components and dispose of the resultant debris in accordance with this section.

C. Relocation

Remove and relocate existing facilities to the designated new locations as shown in the contract documents.

3.3 CLEANUP

A. Removal of Demolished Material: Remove all waste material from the project site and comply with all applicable government regulations in disposing of said waste material.

B. All materials and equipment to be removed, except that indicated to be reused or delivered as directed by the Officer-in-Charge, shall become the property of the Contractor and shall be removed from the site.

C. Remove debris resulting from this work from the site as promptly as it accumulates.

D. Cleanup: Remove all evidence of demolition work and leave areas impacted by demolition work in clean and debris-free condition.

3.4 MEASUREMENT AND PAYMENT

Demolition Work will be paid on a lump sum basis. Measurement for payment will not apply. Payment will be full compensation for the work prescribed in this section and the contract documents.

Relocation of existing facilities and tree protection shall not be considered included and will be paid for separately as shown in the Proposal.

END OF SECTION

SECTION 02268

GROUTED ANCHORS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

This work shall consist of installation of grouted anchors for shotcrete reinforcing and grouted wire rope anchors in accordance with the design documents at the locations shown on the plans or as directed by the Engineer. The Contractor shall install all anchors as specified by the design plans, and supply all materials, equipment, and labor required for the installation of the anchors specified herein.

Grouted anchors shall be installed as shotcrete anchorage.

1.02 SUBMITTALS

The Contractor shall submit in writing, not less than two weeks prior to the beginning of the drilling, to the Engineer for approval the following items for the grouted anchors:

A. The Contractor shall submit a detailed plan. The plan shall include:

1. The proposed construction sequence.

2. The proposed drilling methods and equipment.

3. The proposed grout mix design specifications, including manufacturer's data sheets and catalog cuts, plus the procedure and equipment used for placing the grout or epoxy adhesive.

4. The proposed anchor and coupler specifications, including manufacturers' data sheets, catalog cuts, and material certifications. Material certification shall include written documentation verifying the hot-dip galvanization process.

5. A detailed schedule of work for performing grouted anchor installation, including final cleanup and washing of grouting equipment.

B. Work shall not begin until the plan has been approved in writing by the Engineer.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Grouted Anchors

Grouted anchors for shotcrete anchorage shall be 1” diameter threaded solid steel bars, stainless steel type 316.

B. Grout

Grout for the anchors shall consist of cement grout capable of permanently developing the bond and internal strength necessary for the project. Cement grout shall be non-shrink, non-metallic, high strength pre-engineered packaged grout with a minimum compressive strength of 5,000 psi in three (3) days when mixed to flowable consistency. If a non-prepackaged grout is used the Contractor shall submit to the Engineer for review and approval, the desired mix design along with compression test results performed by an independent laboratory specifically for this project proving the mix will achieve the minimum compressive strength specified above. Submit all grout material mix design information and compression test results, performed by an independent laboratory for the purpose of this project (results from previous projects will not be accepted), to the Engineer for approval. Grout that achieves the specified three (3) day compressive strength will be considered acceptable for the project. Grouting shall not commence until the grout is approved in writing by the Engineer. Cement grout shall be capable of being hydraulically pumped to the bottom of the drill hole allowing it to rise upwards filling all cavities of the drill hole.

Water for mixing grout shall be potable, clean and free of injurious quantities of substances known to be harmful to Portland cement or bar steel.

Equipment for mixing grout shall be high speed colloidal mixer with shearing action. The grouting equipment shall be capable of continuous mixing and shall produce a homogeneous grout mixture free of lumps. Batch mixing shall be per manufacturer’s recommendations.

C. Miscellaneous Materials

All miscellaneous materials for the shotcrete grouted anchors such as plates, nuts, etc. shall be stainless steel type 316. All miscellaneous materials for the wire rope anchors such as bolts, nuts, washers, plates, etc. shall be hot-dipped galvanized steel. All exposed steel shall be powder coated color flat black, unless specified otherwise on the plans.

D. Centralizers

Centralizers shall be placed along the length of the anchor as detailed in the plans, with no less than two (2) per bar. Centralizers shall permit the free flow of grout to pass through in the drilled hole and shall be securely fastened to prevent displacement. Centralizers shall be made of PVC schedule 40 and shall be the size so to keep the bar at the center of the drilled hole. If the contractor chooses to make drill holes larger than the minimum parameters specified on the plans, the centralizer sizing shall be adjusted to keep the anchor centered in the drilled hole. Any anchor bar that is not in the center of the hole (a deviation from the center of the drilled hole equal to 8% of the hole diameter or 0.5 inches, whichever is smaller, will be permitted) shall be rejected and replaced at no additional cost to the State.

PART 3 - EXECUTION

3.01 INSTALLATION

The anchors shall be handled and stored in such a manner as to avoid damage. Damage to the bars as a result of abrasions, rust, cuts, nicks, welds, and weld splatter will be cause for rejection. The bars shall be protected from dirt and harmful substances.

Prior to installation, all mill scale and grease shall be removed from the bar.

All anchors shall be inspected and approved, for not having coating damage, by the Engineer prior to installation. Any anchor installed and not approved shall be rejected and replaced with new anchors without any additional cost to the State.

All anchor locations shall be marked in the field to be reviewed and approved by the Engineer prior to drilling. Drilling orientations shall be coordinated with the Engineer.

The Contractor shall drill holes to receive the anchors to the diameters and lengths specified by the design documents. The Contractor shall clean flush the drill holes of all drill cuttings, sludge, and debris with compressed air and install the anchor in the presence of the Engineer immediately prior to the grouting (i.e. within 48 hours), unless otherwise directed by the Engineer. The Engineer reserves the right to observe the cleaning process and bar insertion. Any anchor grouted without the Engineer witnessing proper flushing of the drill hole and bar installation may be grounds for rejection at the Contractor’s expense.

Holes drilled for anchors, in which installation is considered by the Engineer to be impractical, shall be grout filled and re-drilled at the Contractor’s expense. All unused holes shall be grout filled and capped with sculpted grout at the Contractor’s expense.

Anchors must be installed at the center of the drilled hole using centralizers as shown on the plans and as described in Subsection 2.01.D.

The Contractor shall notify the Engineer in writing at least three (3) working days, excluding weekends and holidays, prior to any scheduled grouting operation, at which time the Contractor shall provide the Engineer with a schedule of grouting. Grouting shall be performed according to the schedule and must be observed by the Engineer. Grouting performed not in the presence of the Engineer shall be grounds for rejection of the anchor at the Contractor's expense. All rejected anchors shall be replaced at no additional cost to the State.

It is anticipated that the Contractor may encounter cracks and fractures within the subsurface during drilling and grouting operation. The Contractor shall be prepared to manage complete grouted anchor installation under the above conditions without any additional cost to the State. Use of grout socks requires a written approval from the Engineer. Contractor shall make every effort to provide reasonable justification to the Engineer for using grout socks. Grout socks shall be of the materials which allow passage of cement water to the surrounding anchor hole area. Grout sock diameter shall be a minimum of 40% larger than the drilled holes. Contractor shall submit grout sock information for approval by the Engineer prior to installation.

Grout shall be pumped into the bore hole from the bottom to the top. Mix the grout according to the grout manufacturer's instructions for flowable consistency. Pump the grout into the borehole through a pre-inserted grout tube that extends to the bottom of the hole. The grout tube shall be temporarily fastened to the end of the anchor bar prior to inserting the bar into the hole. The end of the grout tube shall remain in the grout until the hole is completely filled to the top. No top grouting will be allowed. All grout tubes must be removed immediately after grouting is completed.

Avoid spilling grout, wet or dry, onto the work area. All spilled grout shall be completely removed from the rock surface and disposed of, and the area shall be restored to its natural conditions by the Contractor at no additional cost to the State.

No tension loading will be applied to anchors.

3.02 TESTING

Testing of anchors will not be required. All grouting must be performed in the presence of the Engineer. Allow at least three (3) working days advanced notice excluding weekends and holidays prior to grouting. No grouting shall take place without the Engineer being present. Any anchor grouted without the presence of the Engineer shall be cause for rejection at no cost to the State. Prior to grouting, upon the request of the Engineer, the Contractor shall provide proof of drilled hole depth.

3.03 FINAL CLEANUP

All work area, including vegetation, shall be clean and free of grout and cement residue. Clean all spilled grout from the exposed rock surfaces. All rocks, debris, and surplus earth resulting from work of this section shall be relocated on site at a location approved by the Engineer.

All equipment wash water shall be contained and disposed of offsite. No wash water shall be dumped on site. No equipment shall be washed on the park grounds without proper containment apparatus that has been pre-approved by the Engineer.

PART 4 – MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

Grouted Anchors installed as shotcrete anchorage shall not be measured for payment and shall be considered included in the contract price bid for shotcrete. All costs of mobilization, materials, labor, equipment, and clearing shall be considered included.

4.02 PAYMENT

The cost for Grouted Anchors installed as shotcrete anchorage shall be considered included in the contract price bid for Shotcrete.

END OF SECTION

SECTION 02271

GROUTED RIPRAP

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

This work shall consist of installation of grouted riprap in accordance with the design documents at the locations shown on the plans or as directed by the Engineer. The Contractor shall install grouted riprap as specified by the design plans, and supply all materials, equipment, and labor required for the installation of the anchors specified herein.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Stone

Stones shall be clean, free of seams and blemishes or other imperfections, and when tested in accordance with ASTM shall show wear not to exceed 50%. All stones shall be obtained from the same source. All stones shall be moss rock or blue stone (quarried or shattered face exposed). The stones may be variable in sizes, shall not be thicker than the depth of the course being placed.

Stones shall have a unit weight of 155 pounds per cubic foot.

Stone D50 shall be 12 inches.

Stones for rip rap shall be obtained from excavation under contract, if meeting above requirements, otherwise imported.

Imported stones for riprap shall be quarried, field stones or salvaged from an approved source. The source(s) of stones shall be approved by the Engineer prior to the start of construction. Approval of a source of stones shall not be construed as an approval of all material from that source, nor that the source will produce the quantity and size required by this specification.

B. Grout

Grout shall consist of 1 par portland cement to 3 parts fine aggregate by volume, and shall be used within 30 minutes after its preparation.

Water for mixing grout shall be potable, clean and free of injurious quantities of substances known to be harmful to Portland cement or bar steel.

Equipment for mixing grout shall be high speed colloidal mixer with shearing action. The grouting equipment shall be capable of continuous mixing and shall produce a homogeneous grout mixture free of lumps. Batch mixing shall be per manufacturer's recommendations.

PART 3 - EXECUTION

3.01 INSTALLATION

Excavate in accordance with the contract specifications.

Free foundation bed of brush, trees, stumps, roots, debris, and other objectionable materials, and dress to smooth surface.

Compact bed until relative compaction is not less than 90 percent and finish to smooth surface. Prior to laying stones, provide 3 days notice to the Engineer for inspection of foundation bed. Begin laying stones only after foundation is acceptable to the Engineer.

Moisten bedding material with water. Wet stones before laying. Lay stones in a full bed of grout having stiff consistency. Use selected stones and shape roughly to make joints between 1/4 inch to 1/2 inch in width.

Bed stones in grout and form uniform planar surface with broken joints.

Construct open joints at GRP surface as noted on the plans, pointing is not required. Clean visible excess grout from the surface of the within 24 hours after placing stones. Visible grout on exposed rock surface will not be allowed.

Finish surface shall not deviate more than 1 inch with a 6-foot straightedge.

The riprap should be placed so that it produces a dense well-graded mass of stone with a minimum of voids. The desired distribution of stones throughout the mass may be obtained by selective loading at the quarry, controlled clumping of successive loads during final placing, or by combination of these methods. The riprap should be placed to its full thickness in one operation.

Distribute stones to prevent large accumulations of either large or small sized stones. Hand place or rearrange individual stones by mechanical equipment to match dimensions shown in contract documents.

Stones shall be placed to match the limits, elevations, lines and slopes as indicated on the drawings and as specified hereinafter. Stones shall be in pieces generally rectangular in cross section, the least dimension of any piece being not less than one-third its greatest dimension. In general, the stone shall be fitted and placed so that vertical joints are broken with the long axis of the stone set approximately normal to the structure slope and pointing inward toward the center of the structure section. The Contractor shall maintain the placed stone until accepted and any material displaced by any cause shall be replaced at his expense.

Stones shall be selected with care as to size and shape and placed in such a manner as to produce the required section as indicated on the drawing. Each stone shall be fitted and keyed with adjacent stones, leaving voids through which underlying stones cannot pass. Resetting of adjacent in-place stone to provide for proper placing of shifted or separated stone shall be considered incidental to this work. All stone shall rest securely upon the underlying stone.

Removal of Rejected Stones: If any placed stone is found defective in quality, size, shape, weight or placement, the Contractor shall promptly remove the defective stone and replace it with a new stone or reset the required stone to the satisfaction of the Engineer, at no increase in contract price.

Avoid spilling grout, wet or dry, onto the work area. All spilled grout shall be completely removed from the rock surface and disposed of, and the area shall be restored to its natural conditions by the Contractor at no additional cost to the State.

3.02 FINAL CLEANUP

All work area, including vegetation, shall be clean and free of grout and cement residue. Clean all spilled grout from the exposed rock surfaces. All rocks, debris, and surplus earth resulting from work of this section shall be relocated on site at a location approved by the Engineer.

All equipment wash water shall be contained and disposed of offsite. No wash water shall be dumped on site. No equipment shall be washed on the park grounds without proper containment apparatus that has been pre-approved by the Engineer.

PART 4 – MEASUREMENT AND PAYMENT

Grouted Riprap will be paid on a lump sum basis. Measurement for payment will not apply. Payment will be full compensation for the work prescribed in this section and the contract documents.

END OF SECTION

SECTION 02300

AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

This section describes furnishing and placing aggregate.

1.2 SUBMITTALS

Submit all material literature and installation information to the Engineer for review and approval prior to placement.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Base Course.

Aggregate shall be as specified by HDOT Standard Specifications, Section 304 – Aggregate Base Course.

B. Coarse Aggregate.

Aggregate shall be as specified by HDOT Standard Specifications, Section 703.04 – Aggregate for Untreated Permeable Base.

PART 3 - EXECUTION

3.1 GENERAL

Aggregate Base Course shall be placed and compacted per HDOT Standard Specifications, unless otherwise stated in the contract documents. Coarse Aggregate shall be placed per HDOT Standard Specifications and compacted.

3.2 MEASUREMENT AND PAYMENT

Aggregate Base Course and Coarse Aggregate shall not be paid for separately and the cost shall be included in the cost for the various contract items.

END OF SECTION

SECTION 03361 - SHOTCRETE

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS:

This section describes furnishing and placing fiber-reinforced shotcrete (pneumatically applied mortar) in accordance with ASTM C1116-02 – Standard Specification for Fiber-Reinforced Concrete and Shotcrete. Shotcrete consists of pneumatically applied mortar using either the dry-mix or wet-mix process. All shotcrete placed for this project shall be applied by the wet-mix process. Dry-mix process may be approved for unreinforced areas only with written approval from the Engineer. The Contractor shall place as specified by the design plans or as directed by the Engineer, and supply all materials, equipment, and labor required for the installation of the shotcrete as specified herein.

1.02 SUBMITTALS:

The Contractor shall submit in writing, not less than two weeks prior to the beginning of the shotcreting, to the Engineer for approval of the following items:

A. Submit proposed mix design.

For mix design using admixtures, submit the following:

1. Written documentation and supporting data from the manufacturer indicating the admixture attributes.

2. Compressive strength test results, performed by an independent laboratory for the purpose of this project. Results from other projects will not be accepted.

3. Independent certified concrete testing laboratory credentials, concrete inspector's qualifications, and concrete inspector's pass/fail criteria. See Subsection 3.01 – Proportioning, Batching, and Mixing for details.

B. Submit proposed equipment, manufacturer's specifications, and operating instructions.

C. Submit a resume and certifications for each proposed nozzle operator. See Subsection 3.05 – Crew Qualifications for information.

D. Submit a work plan including equipment washing and final cleanup.

E. Submit specifications, data sheets, and material certifications for all reinforcing members, drain strips, and dowels.

PART 2 - QUALITY CONTROL/QUALITY ASSURANCE

The Contractor shall hire and pay for an independent testing lab to perform all required laboratory tests on shotcrete as described in these documents. For shotcrete with admixtures, Contractor shall hire and pay for a concrete inspector from an independent concrete testing lab for quality control during construction, see Subsection 3.01. Concrete inspector and testing lab shall adhere to all applicable ASTM standards and requirements.

2.01 PRECONSTRUCTION TESTING:

Pre-Construction testing shall be performed to check mix design, equipment, and qualification of nozzlemen. Test panels shall be produced using the same personnel and equipment that was proposed for this project.

Prepare one (1) preconstruction test panel in accordance with ASTM C 1140 for each proposed mix proportion, each anticipated shooting orientation, and each proposed nozzle operator. Make test panels at least 30 inches square with the same thickness as in the structure, but not more than 6 inches. Provide reinforcement of the same size and spacing required for the work. Obtain six (6) test core specimens from each panel, as described in Subsection 2.01.A and 2.01.B below. Shooting of test panels and all coring shall be performed in the presence of the Engineer. Contractor shall notify the Engineer at least three (3) days in advance of shooting the test panels. Test panels and core samples produced without the Engineer present shall be rejected and any work required for additional testing shall be at the Contractor's expense. All test results shall be submitted to the Engineer for review and approval prior to placing any shotcrete on site. Job shotcrete placed without the Engineer's written approval of the pre-construction test results shall be rejected and removed/replaced at the Contractor's expense.

A. Three (3) reinforced cores shall be taken from each test panel and sent to the Engineer to be visually graded. Each core shall be taken through a reinforcing member to verify the proper coverage around the reinforcement. The Engineer will visually grade reinforced specimens for conformance to specified core grade as specified in Subsection 2.03 – Shotcrete Core Grades.

   Allow only nozzle operators with test panel mean core grade less than or equal to 2.5 to place job shotcrete. Nozzle operator shall shot a second test panel if the first test panel is rejected. If nozzle operator's second mean core is greater than 2.5, that nozzle operator will not be permitted to shoot on the project.

B. Three (3) unreinforced cores shall be taken from each test panel and tested for compressive strength to verify shotcrete mix design requirement. Compression testing shall be performed by an independent laboratory hired and paid for by the Contractor. Test results shall be submitted to the Engineer for review and approval. Testing shall be in accordance with ASTM C 1604/C 1609M.

Panels with cores meeting the compressive strength requirements and acceptable grades will be considered acceptance of the nozzleman upon written approval by the Engineer.

2.02 CONSTRUCTION TESTING:

Produce material test panel for each mix and each workday or every 50 cubic yards placed, whichever is less. Keep test panels moist and at 70 degrees F ±10 degrees F until moved to test laboratory. Obtain test specimens from job site material test panel. Test specimens from test panels in accordance with ASTM C 1140. Samples shall be cored and distributed for testing similar to pre-construction testing as described in Subsections 2.01.A and 2.01.B.

The mean compressive strength of a set of three cores shall equal or exceed 0.85f'c with no individual core less than 0.75 f'c.

2.03 SHOTCRETE CORE GRADE:

A. Grade 1:

Shotcrete specimens are solid; there are no laminations, sandy areas or voids. Small air voids with maximum diameter of 1/8 inch and maximum length of 1/4 inch are normal and acceptable. Sand pockets or voids behind continuous reinforcing steel are unacceptable. The surface against the form or bond plane shall be sound, without sandy texture or voids.

B. Grade 2:

Shotcrete specimens shall have no more than two laminations or sandy areas with dimensions not to exceed 1/8 inch thick by 1 inch long. The height, width, and depth of voids shall not exceed 3/8 inch. Porous areas behind reinforcing steel shall not exceed 1/2 inch in any direction except along length of reinforcing steel. The surface against the form or bond plane shall be sound, without sandy texture or voids.

C. Grade 3:

Shotcrete specimens shall have no more than two laminations or sandy areas with dimensions exceeding 3/16 inch thick by 1-1/4 inches long, or one major void, sand pocket, or lamination containing loosely bonded sand not to exceed 5/8 inch thick and 1-1/4 inches in width. The surface against the form or bond plane may be sandy, with voids containing overspray to a depth of 1/16 inch.

D. Grade 4:

Core shall meet, in general, requirements of Grade 3 cores, but may have two major flaws such as described for Grade 3, or may have one flaw with maximum dimension of 1 inch perpendicular to the face of the core, with maximum width of 1-1/2 inches. The end of the core that was shot against the form may be sandy, with voids containing overspray to a depth of 1/8 inch.

E. Grade 5:

Core that does not meet criteria of core grades 1 through 4, by being of poorer quality, shall be classified as Grade 5.

F. Determine grade by computing the mean of a minimum of three test specimens. Accept mean grade of 2.5 or less. Reject individual shotcrete cores with grade greater than 3.

G. The above core grades are based on cores with surface area of 50 square inches. For cores with greater or lesser area than 50 square inches, adjust allowable flaws relative to 50 square inches.

2.04 EVALUATION OF IN-PLACE SHOTCRETE:

Remove and replace shotcrete that is delaminated, exhibits laminations, voids, or sand pockets exceeding limits for specified grade of shotcrete. Remove and replace shotcrete that does not comply with specified material properties. Repair core holes in accordance with ACI 301 Chapter 9. Do not fill holes by shooting.

2.05 ACCEPTANCE:

The Engineer will accept shotcrete work that meets requirements of the contract documents. The Engineer will accept shotcrete work that has previously failed to meet one or more requirements, but which has been repaired to meet requirements of the contract documents.

Shotcrete work that fails to meet one or more requirements and that cannot be brought into compliance will be evaluated for acceptance by the Engineer. Modifications and/or removal may be required to ensure remaining work complies with requirements of the contract documents. Modification, removal, and/or replacement of failed shotcrete work, as determined by the Engineer, shall be completed at the Contractor's expense at no additional cost to the State.

2.06 MATERIALS:

A. Shotcrete.

Shotcrete mix shall have a 28 day compressive strength of at least 4,000 psi.

B. Fiber Reinforcement

Fiber reinforcement shall be 100 percent virgin polypropylene fibrillated fibers specifically manufactured for use as secondary concrete reinforcement, containing no reprocessed olefin materials. Fibers shall comply with ASTM C-1116, Standard Specification for Synthetic Fibers Reinforcement.

Fibers shall have a minimum specific gravity of 0.90 and a minimum tensile strength of 80 ksi. Fiber length shall be 2.25 inch,

Fiber reinforcement shall be added to the shotcrete at a minimum rate of 1.5 pounds per cubic yard of shotcrete materials and mixed in strict accordance with the synthetic fiber reinforcement manufacturer's instructions and recommendations for uniform and complete dispersion.

C. Reinforcing Steel

Reinforcing steel shall be 6 x 6 – W2.9 x W2.9 (or heavier) hot-dipped galvanized welded wire fabric and as specified by the design documents.

Steel reinforcement shall be protected at all times from damage. All reinforcing steel shall be new, free from dirt, detrimental scale, paint, oil, or other foreign substances. Cleaning by sandblasting will not be allowed. All steel shall be kept on pallets and high above the ground and protected as not to allow damage to protective coating.

Reinforcement shall be accurately placed, supported, aligned, and secured against movement. Welded wire fabric shall not be in direct contact with the ground surface at any point. Concrete spacers shall be used where necessary to maintain spacing between the mesh and the slope surface as specified on the plans at no additional cost to the State. Rocks, twigs, and other objects used as spacers will

not be accepted.

Splicing of wire mesh shall be made by lapping not less than two mesh squares and securely tied.

No shotcrete shall be placed prior to the inspection and approval of the placement of all reinforcement by the Engineer.

D. Grouted Anchors

Grouted anchors shall be installed as shotcrete anchorage within the shotcrete area as shown on the plans. See Section 02268 – Grouted Anchors.

E. Fiber Reinforced Polymer (FRP) Reinforcing Dowels

Fiber reinforced polymer (FRP) reinforcing dowels shall be installed within the shotcrete area as shown on the plans. FRP bars may be made from glass or carbon fibers. Bars shall have a surface treatment that facilitates a bond between the finished bar and shotcrete.

Submit FRP material information to the Engineer for review and approval prior to installation.

F. Geocomposite Drain

Submit product information to the Engineer for review and acceptance prior to installation.

1. Drain strip shall be a two part prefabricated soil drain consisting of a formed out polystyrene core on all sides with a non-woven, needle punched polypropylene filter fabric.

   Fabric Properties:

Material:	Polypropylene	
Grab Tensile:	110 lbs	per ASTM D4632
Puncture:	65 lbs	per ASTM D4833
Mullen Burst:	215 psi	per ASTM D3786
Elongation:	60%	per ASTM D4632
AOS Std.:	100 sieve	per ASTM D4751
Flow Rate:	150 gpm/sq ft	per ASTM D4491

   Product Properties:

Flow Capacity per unit width:	21 gpm/ln ft	per ASTM D4716
Thickness:	1 inch	

2. Geocomposite drain strips shall be 12 inches wide, unless specified otherwise on the plans, and placed 4 feet center-to-center where called for on the plans. If the Contractor needs to cut the drainage strips along the length to produce the desired width, all work must be in accordance with the manufacturer's approved written directions.

3. Geocomposite drain shall be suitably wrapped and protected from exposure to direct sunlight.

4. Geocomposite drains shall be placed in strips and connected in accordance with manufacturer's instructions to maintain continuity of flow channel through the drain. Splices shall overlap a minimum of 6 inches or as recommended by the manufacturer. Splice ends by peeling back the fabric and interlocking the dimpled core. Re-attach the fabric and cover with tape.

5. Geocomposite drains shall be installed to ensure that the drains are hydraulically connected from the top to the bottom of the shotcrete. Connect universal tee outlets and weep holes where specified by the design documents, per manufacturer's instructions.

6. Geocomposite drains shall be attached to the surface by placing geotextile fabric directly against the slope surface. Drain strips shall be secured firmly against the slope surface per manufacturer's recommendations.

7. Should the geotextile cover fabric become damaged during installation by tearing or puncturing, the damaged section shall be completely cut out and replaced.

8. Geocomposite drains shall be protected from damage and deleterious contamination where drains must remain exposed until they are covered with embankment or backfill material.

PART 3 - EXECUTION

Use shotcrete only at locations indicated in the contract documents or ordered by the Engineer. Contractor shall request Engineer inspection of the shotcrete area for proper placement of reinforcing, drainage, etc. prior to shotcrete operations. Contractor shall notify the Engineer of this inspection at least three (3) days in advance of shotcreting. Contractor shall schedule the inspection to have ample time (a full working day at a minimum) to make corrective actions before the shotcrete operation if necessary.

Shotcrete work shall be performed in the presence of the Engineer. Any shotcrete placed without the Engineer present shall be rejected and replaced at the Contractor's expense.

3.01 PROPORTIONING, BATCHING, AND MIXING:

Batch the quantity of water as specified in mix design accepted by the Engineer for the process used. Proportion mortar ingredients, except water, either by volume or by weight. Batches requiring fractional sacks will not be allowed unless cement is weighed. Shotcrete shall be placed within 90 minutes from initial batching unless an approved mix design using admixtures validates a longer set time as described below. Otherwise, shotcrete placed that is over 90 minutes old shall not be approved and shall be replaced at the Contractor's expense. Shotcrete shall be in accordance with ASTM C94.

Admixtures may be added to improve set time and workability in which case the shotcrete may be placed within a longer time frame than that specified above. However, the Contractor shall provide, with the initial shotcrete submittal, written documentation and supporting data from the manufacturer indicating the admixture attributes. With every truck load of shotcrete delivered to the job site, the Contractor shall provide specific information and documentation from the batch plant as to the additives the respective quantities that are mixed in that particular batch. This information shall be provided to the Engineer at the time of shotcrete delivery before the shotcrete batch could be considered for approval. In addition, the Contractor shall provide compressive test results, by an independent laboratory, for the proposed mix design with admixture performed for this project and hire a concrete inspector, see paragraph below. Shotcrete operation, including shooting the pre-construction test panels, shall not begin until the proposed mix design and all supplemental information is reviewed and approved by the Engineer.

For shotcrete with admixtures, the Contractor shall provide and hire, at no additional cost to the State, a concrete inspector from an independent certified concrete testing laboratory to monitor properties of the concrete for quality control such as set time, slump, temperature, etc. The concrete inspector shall be present at the site during all shotcrete work and shall validate or reject concrete based on the applicable standards (i.e. set time, slump, temperature, etc.) for the approved shotcrete mix design with admixture. Contractor shall submit the concrete inspector's pass/fail criteria to the Engineer for review and approval prior to shotcrete operation. All rejected shotcrete placed on the job, as determined by the concrete inspector, shall be removed and replaced at the Contractor's expense.

A. Dry-Mix Process.

Thoroughly mix cement and fine aggregate before charging into delivery equipment. Maintain moisture content of fine aggregate between 3 to 6 percent, such that fine aggregate-cement mixture flows at a uniform rate (without slugs) through delivery hose.

B. Wet-Mix Process.

Mix material at central mixing plant or at project site. If mixing is done at project site, use mixer capable of thoroughly mixing specified materials in sufficient quantity to maintain continuous shotcrete placement.

C. Fiber-Reinforcement

Fiber-reinforcement shall be added to the shotcrete at the minimum rate of 1.5 pounds per cubic yard of shotcrete materials and mixed in strict accordance with the synthetic fiber reinforcement manufacturer's instructions and recommendations for uniform and complete dispersion.

3.02 SHOTCRETE PROCESS - GENERAL:

All shotcrete shall be applied using wet-mix process. Dry-mix shall only be used with prior written approval from the Engineer.

A. Dry-Mix Process.

1. Mix cement and fine aggregates thoroughly.

2. Feed cement-fine aggregate mixture into special mechanical feeder (gun) or other delivery equipment accepted by the Engineer.

3. Meter mixture into delivery hose by feed wheel or distributor.

4. Convey mixture by compressed air through delivery hose to special nozzle. Fit nozzle with perforated manifold capable of introducing water under pressure and thoroughly mixing water with other ingredients.

5. Jet mortar from nozzle at high velocity onto shotcrete-receiving surface.

Contractor shall shoot sample shotcrete so that the Engineer can check the consistency of the material prior to installation of job shotcrete. Sample shotcrete shall not be placed within areas designated for job shotcrete.

B. Wet-Mix Process.

1. Mix ingredients thoroughly, as specified in Subsection 3.01-(A) – Dry-Mix Process, including water.

2. Introduce mortar into delivery equipment chamber.

3. Meter mortar into delivery hose and convey mortar to nozzle by compressed air or by other means.

4. Inject additional air at nozzle to increase velocity and improve gunning pattern.

5. Jet mortar from nozzle at high velocity onto the shotcrete-receiving surface.

3.03 EQUIPMENT:

Operate equipment in accordance with manufacturer's recommendations.

A. Dry-Mix Process.

Provide mixing equipment that will mix ingredients thoroughly and continuously.

Contractor shall provide measures to control dust pollution during mixing process.

Discharge fine aggregate-cement mixture into delivery hose in a manner that ensures delivery of a continuous, smooth stream of uniformly mixed material at proper velocity to discharge nozzle.

Equip discharge nozzle with manually operated water injection system (water ring) for directing even distribution of water through fine aggregate-cement mixture. Provide water valve capable of adjusting quantity of water delivered to nozzle. Locate water valve to enable nozzle operator to instantaneously adjust water volume as necessary during shotcrete application.

Deliver conical discharge stream of uniform appearance. If stream distortion or non-uniform appearance is noted, suspend shotcrete application until uniform shotcrete discharge is restored.

Use adequate supply of clean air to maintain required nozzle velocity and simultaneous blowpipe operation for removing rebound.

Supply water at uniform pressure of at least 15 pounds per square inch greater than operating air pressure at the nozzle. Use water booster pump to provide required pressure if line water pressure is inadequate.

B. Wet-Mix Process**.**

Provide wet-mix delivery equipment of design and size that has produced satisfactory results in similar work. Use wet-mix equipment that has adequate capacity to deliver pre-mixed materials accurately, uniformly, and continuously through delivery hose. Follow manufacturer's recommendations regarding:

1. Type and size of nozzle.

2. Cleaning equipment.

3. Inspecting equipment.

4. Maintaining equipment.

Provide air compressor capable of performing as specified in Subsection 3.03-(A) - Dry Mix Process and wet-mix equipment manufacturer's recommendations.

3.04 SURFACE PREPARATION:

Perform general clearing of the slope including the removal of vegetation within the shotcrete limits prior to applying shotcrete. This work shall be considered incidental to shotcrete installation.

A. Subgrade. Dampen surface immediately before shooting with sufficient moisture to provide firm foundation and to prevent absorption of water from the mortar, but without free surface water.

B. Concrete, Masonry, and Shotcrete. When bonding is required, remove all deteriorated, loose, unsound material, or contaminants that may inhibit bonding. Chip areas to be covered to remove offsets causing abrupt changes in thickness. Taper edges to eliminate square shoulders at perimeter of a cavity. Maintain surface saturated, surface-dry immediately before applying shotcrete.

C. Steel. Remove loose mill scale, rust, oil, paint, or other contaminants. Prepare surface in accordance with SSPC-SP6.6. If high-pressure water blasting is used, remove all freestanding water before applying shotcrete.

D. Rock. Remove loose material, mud, or other foreign material that will prevent bonding. Clean and pre-wet surface immediately before applying shotcrete.

E. Forms. If forms are to be removed after use, apply form-releasing coating material on forms. Use coating material that does not alter shotcrete properties or interfere with bond of subsequent shotcrete layers. Secure forms to minimize effects of vibration. Construct forms to allow escape of placement air and rebound.

3.05 CREW QUALIFICATIONS:

Nozzle operators shall possess an ACI Shotcrete Nozzleman certification and have at least two (2) years of experience in this type of work. Nozzle operator may be apprentice with at least six (6) months of experience if supervised by a foreman with at least two (2) years of nozzle operator experience. Apprentice nozzle operators shall possess an ACI Shotcrete Nozzleman-in-Training certification. All nozzle operators shall be ACI certified in wet mix or dry mix process, depending on the method the Contractor chooses to place job shotcrete. All ACI certifications shall be valid. Shotcrete shall only be placed by the ACI certified nozzle operators that were approved for this project. Any shotcrete placed by a non-approved operator shall be rejected and replaced at the Contractor's expense.

3.06 ALIGNMENT CONTROL:

Provide joints, side forms, headers, and shooting strips for backing or paneling. Place in a manner that minimizes trapping of rebound. Install ground wires as guides to establish thicknesses, surface planes, and finish lines. Maintain wires taut and true to line at all times during shotcreting application.

3.07 GUNNING:

Place shotcrete first in corners, recesses, and other areas where rebound or overspray cannot escape easily. Place shotcrete with nozzle held approximately perpendicular to receiving surface. In corners, direct nozzle at approximately 45-degree angle or bisect corner angle. Construct ditch lining in non-sagging layers. Build up each layer by making several passes of the nozzle over specified surface. Apply shotcrete from nozzle in steady, uninterrupted flow. Should flow become intermittent, direct flow away from work area until steady, uninterrupted flow is restored.

In gunning walls, apply mortar beginning at the bottom. Build first layer up to thickness that will embed reinforcement, without sagging. Remove slugs, sand spots, and wet sloughs. Resurface affected areas as the work progresses. Allow each layer ample time to set. Remove rebound material from each layer before applying next layer. If final set has taken place, wet down area before next application.

Suspend gunning if high winds prevent nozzle operator from properly applying shotcrete or if rain washes out or causes shotcrete to slough.

3.08 REBOUND:

Remove rebound or overspray from previously prepared surfaces prior to shotcrete placement. Reuse of rebound or overspray will not be allowed.

3.09 CONSTRUCTION JOINTS:

Form construction joints by tapering to a 1-inch edge over a distance of 12 inches, where joints are not subject to compression loads. Use square construction joints in areas subject to compression loads. Clean construction joints thoroughly and saturate surface of construction joints surface dry immediately before applying shotcrete.

3.10 FINISHING:

Exposed surfaces shall have sculpted shotcrete finish or smooth trowel as specified by the design documents. See Section 03362 – Sculpted Shotcrete Finish.

3.11 CURING AND PROTECTION:

A. All shotcrete shall be cured for a period of not less than seven (7) days by one of the methods listed below. During this curing period, the shotcrete shall be maintained with minimal moisture loss at a relatively constant temperature. Fresh shotcrete shall be protected from heavy rains, flowing water, mechanical injury, and injurious action of the sun. Curing method selected must be compatible with the finish to be applied to the shotcrete.

   Curing shall immediately follow the finishing operation.

B. Water Curing: If cured with water, shotcrete shall be kept wet by mechanical sprinklers, by ponding, or by any other method which will keep the surfaces continuously wet.

C. Saturated Sand Curing: Surfaces cured with sand shall be covered with a minimum of one inch thickness of sand which shall be kept uniformly distributed and continuously saturated during the entire curing period.

D. Curing Compounds: Curing compounds shall not be used on shotcrete surfaces that are to receive paint finish, acid stain or resilient flooring, except those that are recommended by the manufacturer to be compatible with the applied finish. The Contractor shall submit to the Engineer a letter certifying that the curing compound is compatible with the applied finish. Application shall be in accordance with the manufacturer's recommendations. If curing, sealing or other compounds are used which are incompatible with applied finish, such compound shall be thoroughly removed by grinding with a terrazzo grinder.

E. Waterproof Paper: Waterproof paper or opaque polyethylene film conforming to ASTM C171 may be used. The paper or film shall be anchored securely and all edges sealed or applied in such a manner as to prevent moisture escaping from the shotcrete.

3.12 FINAL CLEANUP:

All work area, including surrounding vegetation, soil and rock surfaces, shall be clean and free of shotcrete or cement residue, wet or dry. All surplus earth resulting from construction shall be cleaned up and disposed. All debris resulting from work of this section shall be removed from the site at no additional cost to the State.

All equipment wash water shall be contained and disposed of offsite. No wash water shall be dumped on the site. No equipment shall be washed on the park grounds without proper containment apparatus that is pre-approved by the Engineer.

PART 4 – MEASUREMENT AND PAYMENT

Shotcrete installation will be paid on a lump sum basis. Measurement for payment will not apply. Payment will be full compensation for the work prescribed in this section and the contract documents.

END OF SECTION

SECTION 03603

EPOXY ADHESIVE

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS:

This section covers the furnishing and installing of epoxy adhesive as required on the plans and in this specification. The epoxy adhesive shall be for grouting of reinforcing steel dowels. Epoxy adhesive shall have a gel consistency ideal for vertical applications.

1.02 SUBMITTALS:

Submit manufacturer's published literature and manufacturer's specifications for physical characteristics and performance data.

1.04 PRODUCT HANDLING:

Store unopened containers at 40 to 95 degrees F.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Officer-in-Charge.

B. Epoxy adhesive shall be a multipurpose, 2 component, solvent free, moisture insensitive structural epoxy adhesive in accordance with ASTM C 881, Types I and II, Grade 3, Classes B and C for Epoxy Resin Adhesives with a minimum pot life of 30 minutes.

C. Physical Properties of Cured Epoxy Adhesive:

ASTM TEST	RESULTS
D-695 Compressive Strength	11,236 psi
D-732 Shear Strength	3,550 psi
D-638 Tensile Strength	2,940 psi
D-790 Flexural Strength	5,582 psi
C-882 Bond Strength	2,460 psi
D-570 Absorption	0.63%
C-883 Shrinkage	complies
C-884 Thermal Compatibility	complies

PART 3 - EXECUTION

3.01 INSTALLATION AND WORKMANSHIP:

Work shall be performed by skilled workmen in conformance with approved commercial practices and the manufacturer's specifications.

A. Surface shall be clean and sound. It may be dry or damp, but free of standing water. Remove dust, grease, curing compounds, foreign particles, and disintegrated materials.

B. Epoxy adhesive shall be mixed in accordance with the manufacture's specifications. Any epoxy adhesive spills shall be properly contained and cleaned up with absorbent material and disposed of outside the project site. The Engineer shall be notified within 24 hours of any spills.

C. Unless otherwise noted on the plans or directed by the Engineer in writing, epoxy adhesive shall be applied by pushing the epoxy through a tube and from the bottom of the hole up similar to the grouting process.

3.02 CLEAN UP

A. During the process of the work, the premises shall be kept reasonably free of all debris and waste materials resulting from the work under this section. All such debris and rubbish shall be removed from the site.

B. Clean residue from drilling immediately after holes are drilled.

PART 4 – MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

Epoxy Adhesive will not be measured for payment.

4.02 PAYMENT

Epoxy Adhesive will not be paid separately. The cost will be considered incidental to various contract items.

END OF SECTION